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$$I_{\alpha}^{-1} \circ I_{\alpha}^{-1} \circ \pi_{\alpha} \circ \delta = \mathbb{P} \circ \pi_{\alpha} \circ \delta \circ I_{\alpha} \circ \delta$$

Edward Parry.



PROCEEDINGS

OF THE BOARD OF AGENCIES

OF THE

GOVERNMENT OF THE DISTRICT OF COLUMBIA

HELD AT THE DISTRICT OF COLUMBIA, D. C.

IN

THE CITY OF WASHINGTON, D. C.

FOR THE YEAR

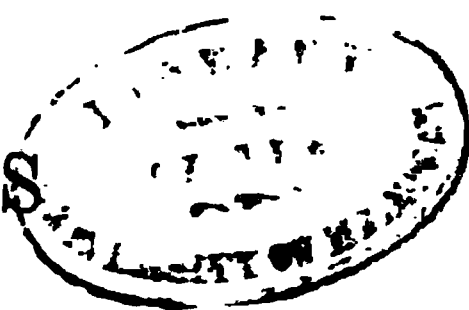
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1876.

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995-9

PROCEEDINGS



OF THE

# AMERICAN PHARMACEUTICAL ASSOCIATION

AT THE

*Twenty-third Annual Meeting,*

HELD IN BOSTON, MASS., SEPTEMBER, 1875.

ALSO THE

CONSTITUTION, BY-LAWS, AND ROLL OF MEMBERS.

---

PHILADELPHIA:  
SHERMAN & CO., PRINTERS.  
1876.

13

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## REPORTER ON PROGRESS OF PHARMACY.

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# List of Officers of the Association

SINCE ITS ORGANIZATION.

(*Deceased in Italics.*)

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<i>Charles Ellis,</i> . . . .	Philadelphia, . . . .	1857-58
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Henry T. Kiersted, . . . .	New York, . . . .	1860-62
<i>William Procter, Jr.,</i> . . . .	Philadelphia, . . . .	1862-68
J. Faris Moore, . . . .	Baltimore, . . . .	1863-64
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<i>John Milhau,</i>	.	.	New York,	.	1862-68
John M. Maisch,	.	.	Philadelphia,	.	1868-64
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Flemming G. Grieve,	.	.	Milledgeville, Ga.,	.	1870-71
C. Lewis Diehl,	.	.	Louisville, Ky.,	.	1871-72
Samuel S. Garrigues,	.	.	East Saginaw, Mich.,	.	1872-78
William Saunders,	.	.	London, Ontario,	.	1878-74
Joseph Roberts,	.	.	Baltimore, Md.,	.	1874-75
Frederick Hoffmann,	.	.	New York,	.	1875-76

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<i>Charles Ellis,</i>	.	.	Philadelphia,	.	1855-56
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<i>Samuel P. Peck,</i>	.	.	Bennington, Vt.,	.	1857-58
James O'Gallagher,	.	.	St. Louis, Mo.,	.	1858-59
Joseph Roberts,	.	.	Baltimore,	.	1859-60
William S. Thompson,	.	.	Baltimore,	.	1860-62
<i>Eugene L. Massot,</i>	.	.	St. Louis, Mo.,	.	1862-68
Charles A. Tufts,	.	.	Dover, N. H.,	.	1868-64
Enno Sander,	.	.	St. Louis, Mo.,	.	1864-65
<i>Elijah W. Sackrider,</i>	.	.	Cleveland, O.,	.	1865-66
Ezekiel H. Sargent,	.	.	Chicago,	.	1866-67
N. Hynson Jennings,	.	.	Baltimore,	.	1867-68
Edward S. Wayne,	.	.	Cincinnati,	.	1868-69
John H. Pope,	.	.	New Orleans,	.	1869-70
James G. Steele,	.	.	San Francisco, Cal.,	.	1870-71
George F. H. Markoe,	.	.	Boston, Mass.,	.	1871-72
Edward P. Nichols,	.	.	Newark, N. J.,	.	1872-78
John T. Buck,	.	.	Jackson, Miss.,	.	1878-74
William T. Wenzell,	.	.	San Francisco, Cal.,	.	1874-75
T. Roberts Baker,	.	.	Richmond Va.,	.	1875-76

## THIRD VICE-PRESIDENTS.

<i>C. Augustus Smith,</i>	.	.	Cincinnati,	.	1852-58
Charles B. Guthrie,	.	.	Memphis, Tenn.,	.	1858-54
<i>Joseph Laidley,</i>	.	.	Richmond, Va.,	.	1854-55

# LIST OF OFFICERS OF THE ASSOCIATION.

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<i>Henry T. Kiersted,</i>	.	.	.	New York,	.	.	1856-57
<i>A. E. Richards,</i>	.	.	.	Plaquemine, La.,	.	.	1857-58
<i>Robert Battey,</i>	.	.	.	Rome, Ga.,	.	.	1858-59
<i>Edwin O. Gale,</i>	.	.	.	Chicago, Ill.,	.	.	1859-60
<i>Theodore Metcalf,</i>	.	.	.	Boston,	.	.	1860-62
<i>J. Faris Moore,</i>	.	.	.	Baltimore,	.	.	1862-63
<i>George W. Weyman,</i>	.	.	.	Pittsburg, Pa.,	.	.	1863-64
<i>Thomas Hollis,</i>	.	.	.	Boston,	.	.	1864-65
<i>Charles A. Heinitsh,</i>	.	.	.	Lancaster, Pa.,	.	.	1865-66
<i>John W. Shedden,</i>	.	.	.	New York,	.	.	1866-67
<i>Daniel Henschman,</i>	.	.	.	Boston,	.	.	1867-68
<i>Albert E. Ebert,</i>	.	.	.	Chicago,	.	.	1868-69
<i>Joel S. Orne,</i>	.	.	.	Cambridgeport, Mass.,	.	.	1869-70
<i>Eugene L. Massot,</i>	.	.	.	St. Louis, Mo.,	.	.	1870-71
<i>Matthew F. Ash,</i>	.	.	.	Jackson, Miss.,	.	.	1871-72
<i>Henry C. Gaylord,</i>	.	.	.	Cleveland, O.,	.	.	1872-73
<i>Paul Balluff,</i>	.	.	.	New York,	.	.	1873-74
<i>Augustus R. Bayley,</i>	.	.	.	Cambridgeport, Mass.,	.	.	1874-75
<i>Christian F. G. Meyer,</i>	.	.	.	St. Louis, Mo.,	.	.	1875-76

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<i>Alfred B. Taylor,</i>	.	.	.	Philadelphia,	.	.	1852-54
<i>Samuel M. Colcord,</i>	.	.	.	Boston,	.	.	1854-56
<i>James S. Aspinwall,</i>	.	.	.	New York,	.	.	1856-57
<i>Samuel M. Colcord,</i>	.	.	.	Boston,	.	.	1857-59
<i>Ashel Boyden,</i>	.	.	.	Boston,	.	.	1859-60
<i>Henry Haviland,</i>	.	.	.	New York,	.	.	1860-63
<i>J. Brown Baxley,</i>	.	.	.	Baltimore,	.	.	1863-65
<i>Charles A. Tufts,</i>	.	.	.	Dover, N. H.,	.	.	1865-76

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<i>George D. Coggeshall,</i>	.	.	.	New York,	.	.	1852-53
<i>Edward Parrish,</i>	.	.	.	Philadelphia,	.	.	1853-54
<i>Edward S. Wayne,</i>	.	.	.	Cincinnati,	.	.	1854-55
<i>William J. M. Gordon,</i>	.	.	.	Cincinnati,	.	.	1855-59
<i>Charles Bullock,</i>	.	.	.	Philadelphia,	.	.	1859-60
<i>James T. Shinn,</i>	.	.	.	Philadelphia,	.	.	1860-62
<i>Peter W. Bedford,</i>	.	.	.	New York,	.	.	1862-63
<i>William Evans, Jr.,</i>	.	.	.	Philadelphia,	.	.	1863-64
<i>Henry N. Rittenhouse,</i>	.	.	.	Philadelphia,	.	.	1864-65
<i>John M. Maisch,</i>	.	.	.	Philadelphia,	.	.	1865-76

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<i>William B. Chapman,</i>	.	.	.	Cincinnati,	.	.	1853-54

<i>William Procter, Jr.</i> , . . .	Philadelphia, . . .	1854-57
<i>Edward Parrish</i> , . . .	Philadelphia, . . .	1857-58
Ambrose Smith, . . .	Philadelphia, . . .	1858-59
<i>William Hegeman</i> , . . .	New York, . . .	1859-60
Peter W. Bedford, . . .	New York, . . .	1860-62
John M. Maisch, . . .	Philadelphia, . . .	1862-63
Peter Wendover Bedford, . . .	New York, . . .	1863-66

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Peter Wendover Bedford, . . .	New York, . . .	1866-67
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Henry W. Fuller, . . .	Chicago, . . .	1868-69
J. Faris Moore, . . .	Baltimore, . . .	1869-70
William H. Crawford, . . .	St. Louis, Mo., . . .	1870-71
Henry C. Gaylord, . . .	Cleveland, O., . . .	1871-72
Thomas H. Hazard, . . .	Richmond, Va., . . .	1872-73
Emil Scheffer, . . .	Louisville, Ky., . . .	1873-74
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## REPORTER ON PROGRESS OF PHARMACY.

C. Lewis Diehl, . . .	Louisville, Ky., . . .	1873-76
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# LIST OF QUERIES

TO BE ANSWERED AT THE TWENTY-FOURTH ANNUAL MEETING, IN 1876,  
AT PHILADELPHIA, PA.

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**QUERY 1.** An essay on Senega Root, embracing the history of its introduction, its geographical range, and its present importance as an article of commerce.

*Accepted by J. D. Wells, Cincinnati, Ohio.*

**2.** What knowledge of therapeutics should the properly educated pharmacist possess?

*Accepted by Benjamin T. Fairchild, New York.*

**3.** A treatise on Salicylic Acid, its solubilities and pharmaceutical uses.

*Accepted by R. V. Mattison, Philadelphia.*

**4.** How does the quality of spirit of nitrous ether of the market compare with the requirements of the U. S. P.? On keeping in half-filled bottles it becomes acid; is this due to aldehyd; and is the latter of therapeutic value in the preparation? If not, can it be removed economically, and would its removal render the preparation more permanent?

*Accepted by P. W. Bedford, New York.*

**5.** According to Z. Roussin the sweet taste of liquorice root is due to an ammoniacal compound of glycyrrhizin (see Am. Jour. Pharm., 1875, Sept.). Query. Can the fluid extract of liquorice root, U. S. P., be mixed with solutions of alkaloids, so as to mask their taste without precipitating them?

*Accepted by William McIntyre, Philadelphia.*

**6.** An essay on the various fluid extracts of commerce, with the view of determining how near they come up to the required standard.

*Accepted by Charles Rice, New York.*

**7.** Can any of the decoctions or infusions of the U. S. P. be satisfactorily prepared from the fluid extracts of the U. S. P., and in what particulars do they differ from infusions and decoctions prepared in the prescribed manner?

*Accepted by John Henry Hancock, Baltimore.*

8. Five grains of citric acid added to the finished product of the formula of the U. S. P., for syrup of ferrous iodide, seems to preserve *unchanged* the appearance of the syrup. Is this addition admissible?

*Accepted by W. H. Pile, Philadelphia.*

9. *Paullinia sorbilis*. A treatise on this article furnishing a formula for a liquid preparation of the drug.

*Accepted by G. W. Kennedy, Pottsville, Pa.*

10. How are compressed pills prepared, and what advantages, if any, do they possess?

*Accepted by John Henry Hancock, Baltimore, Md.*

11. The fluid extract of cotton-root bark occasionally gelatinizes on keeping; can a modification of the process for making this fluid extract be suggested which will prevent such a change? To which principle and to what influences is it due, and has the bark of the green root any superiority over that of the dry in the preparation of the fluid extract?

*Accepted by J. U. Lloyd, Cincinnati, Ohio.*

12. What chemicals may be profitably made by the retail pharmacist, and what apparatus is required for their preparation?

*Accepted by James R. Mercein, Jersey City, N. J.*

13. It is believed by some that hops possess valuable medicinal properties aside from the lupulin and the little tannin. What are the properties of hops from which the lupulin has been completely removed?

*Accepted by P. W. Bedford, New York.*

14. What is the best process for determining the medicinal value of hops and of lupulin?

*Accepted by P. W. Bedford, New York.*

15. What is the nature of the union in the combination of equal parts Chloral Hydrate and Camphor?

*Accepted by Joseph Roberts, Baltimore.*

16. The fixed oils of benne and poppy seed are not protected from oxidation, according to Cloëz, by keeping them in colored bottles (*Journal de Pharmacie et de Chimie*, 4 ser., ii, 845; *Am. Jour. Pharm.*, 1866, p. 86). Query. How are non-drying oils, such as olive, almond, and lard oil, affected when kept under similar circumstances, and what effect has the summer and winter temperature upon the results?

*Accepted by Thomas E. O. Marvin, Portsmouth, N. H.*

17. Is the oil of Ceylon cinnamon used in the preparation of cinnamon water as directed by the U. S. P.?

*Accepted by Edward C. Jones, Philadelphia.*

18. The ground bulb of *Scilla maritima* when moistened with diluted alco-

hol and worked with the hands causes for a time an intolerable itching. To what principle in the bulb is this effect to be ascribed?

*Accepted by Edward D. Chipman, Philadelphia.*

19. An essay on the bromine production of the United States.

*Accepted by Henry S. Wellcome, New York.*

20. The resin of *Leptandra Virginica* (the leptandrin of commerce) varies much in appearance and sensible properties. To what causes are these varying results to be attributed? What is the best process for the preparation of the resin, and what is the average yield from the root?

*Referred to H. G. Keasbey, Philadelphia.*

21. How far are the so-called resinoids of commerce prepared according to the prescribed formulas, and can better processes be devised for the preparation of some of the more important of them?

*Accepted by W. J. M. Gordon, Cincinnati.*

22. How do the preparations *Succus Conii* and *Hyoscyami*, as found in the English markets, compare medicinally with the officinal tinctures made from the carefully prepared and dried herbs?

*Accepted by Charles L. Eberle, Philadelphia.*

23. In preparing emulsions of almonds and other seeds considerable force is required to reduce the seeds to a uniformly smooth mass in order to insure their exhaustion with water. Query. What is the best shape and material for mortars adapted to this purpose?

*Accepted by E. Gregory, Lindsay, Ontario.*

24. To what extent does sulphuric acid occur as an adulteration or accidental impurity in tartaric acid?

*Accepted by J. Williams, Worcester, Mass.*

25. The root of *Epilobium angustifolium* is said to have been used with success in the treatment of aphthæ. Is this opinion well founded, and if so, to what principle in the root is its remedial action to be attributed?

*Accepted by C. J. Biddle, Philadelphia, Pa.*

26. The phosphorus of commerce is often contaminated with arsenic. In what proportion is it present in the various brands of phosphorus found in the American market?

*Accepted by Louis Dohme, Baltimore, Md.*

27. The character of the Peruvian barks supplied to the public by the retail druggists of America.

*Accepted by P. W. Bedford, New York.*

28. An essay on *Gelsemium sempervirens*, embracing the questions as to what principle its activity is due, and whether the green root possesses any advantage over the dry.

*Accepted by W. H. Jones, Boston, Mass.*

29. Is it advisable to have an officinal aromatic spirit that will represent a fine refreshing cologne to be used in lotions and for the sick-room? If so, give a formula and name for the preparation?

*Accepted by George Leis, Lawrence, Kansas.*

80. What advantages would result from the substitution of parts by weight for absolute quantities in the revision of the Pharmacopœia, and if any disadvantages other than those incident to change, what are they?

*Accepted by S. P. Sharples, Boston.*

81. What advantage is there in retaining *alcohol* in Tinct. Ferri Chlor.? Would it be desirable to introduce *Liquor Ferri Chlor. dilut.* of the same iron strength in place of the tincture?

*Accepted by M. S. Bidwell, Elmira, N. Y.*

82. What is Lactopeptin?

*Accepted by Emil Scheffer, Louisville, Ky.*

83. Is it desirable and practicable to introduce in the revision of the Pharmacopœia an assay morphia strength for Tinct. Opii, in place of the present formula yielding a product of indefinite morphia strength?

*Referred to R. J. Brown, Leavenworth, Kansas.*

84. A convenient working formula for Wine of Tar, with samples of product.

*Accepted by Charles A. Heinitch, Lancaster, Pa.*

85. A preparation under the name of Damiana has been recently introduced. What is it? Its medicinal value? An essay on the subject.

*Accepted by Henry S. Wellcome, New York.*

86. What progress has been made in manufacturing important medicinal chemical preparations within the last few years which formerly were exclusively imported?

*Accepted by Dr. A. W. Miller, Philadelphia.*

87. It has been repeatedly asserted that the castor oil of the present day is deficient in strength, larger doses being required than formerly. Is this so? and is it on account of adulteration?

*Accepted by C. Gilbert Wheeler, Chicago, Ill.*

88. An examination into the accuracy of the graduated measures supplied by the jobbing druggists or manufacturer—which are most reliable?

*Accepted by S. P. Sharples, Boston, Mass.*

89. How much acacia is needed to emulsify perfectly the fixed or volatile oils and balsams?

*Accepted by E. Gregory, Lindsay, Ontario.*

40. An essay on wafers for the administration of powders, including mode of manufacture, working formula, and samples of product.

*Accepted by G. A. Zwick, Covington, Ky.*

41. Are the sugar-coated pills vended in our market always what they purport to be? A paper giving the results of an examination of the various makes.

*Continued to David Hays, New York.*

42. The French filtering-paper that is imported at the present time contains an appreciable amount of soluble and a large amount of coloring matter. What substitute can be used, or what can be done to cause an improvement in its quality?

*Continued to James S. Talbot, Boston, Mass.*

43. What drugs are now successfully cultivated here which some years ago were obtained from foreign countries?

*Continued to B. O. Wilson, Boston, Mass.*

44. There is reason for believing that our Oleum theobromæ is largely adulterated. How can adulterations be detected, and to what extent do they exist?

*Continued to Gustavus Ramsperger, New York.*

45. Pancreatic preparations have made their appearance in the market recently in considerable variety. What value do they possess, and what is the most eligible mode of administering?

*Continued to W. S. Thompson, Washington.*

46. Can a process be devised for the production of Apomorphia which will reduce the cost so that it may become available in pharmacy?

*Continued to Charles Rice, New York.*

47. What species of insects are found in America which could be used for vesicating purposes? Are any of them to be had in sufficient quantities to become an article of commerce? And how do they compare in strength with the *Cantharis vesicatoria* and other species found in commerce?

*Continued to William Saunders, London, Ontario.*

48. Rhubarb has of late been much damaged by insect pests. Does the Rhubarb as shipped from China contain this insect, or does it become infested after arrival in Europe and America?

*Continued to William Saunders, London, Ontario.*

49. In the arrangement of the dispensing department of a pharmacy, what advantages are there in having the counter upon which prescriptions are prepared in full view of the customer?

*Continued to J. F. Hancock, Baltimore, Md.*

50. Santonin has been seen in the market in thick prisms, very different in appearance from the usual flat crystals. Is this due to crystallization from a different liquid from that ordinarily used?

*Continued to O. Eberbach, Ann Arbor, Mich.*

51. Can the formula for Scammony resin (U. S. P.) be improved; and what is the objection, if any, to the exhaustion of Scammony by alcohol at ordinary temperatures and simple evaporation of the tincture?

*Continued to George F. H. Markoe, Boston, Mass.*

52. How may concentrated preparations from aromatic drugs be best prepared, so that the preparation shall be permanent and represent all the active constituents of the drug?

*Continued to George F. H. Markoe, Boston, Mass.*

53. An essay suggestive and critical on the best plan of arranging and managing the store-rooms and cellar of a well-conducted dispensing store.

*Continued to J. F. Hancock, Baltimore, Md.*



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## PREFATORY NOTICE.

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THE undersigned are pleased in having accomplished the publication of the present volume at so early a date, which is, in a great measure, due to the promptness with which nearly all of the papers were sent to the Secretary, which, for particular and special reasons, were permitted to be handed to that officer *after* the meeting. A few shortcomings, which came very nearly to cause serious embarrassment and unexpected delay, can, and we trust will, hereafter readily be overcome, if the Association will adhere to the policy of not accepting any paper or report in an unfinished condition. The only exception to this rule should be made with the Report on the Exhibition of Specimens, which, when the importance and dimensions are considered which these exhibitions of late years have assumed, cannot properly be finished during the few days allotted to the meetings, and the Secretary acknowledges with pleasure that he has never had occasion to complain of want of promptness on the part of the members of these committees during the past eleven years.

Through the courtesy of the reporter on the progress of pharmacy it was possible to have all the numerous wood-cuts, which will be found in the present volume, prepared in due time, so that not the slightest delay was occasioned on this account. It should be mentioned here that a number of the cuts in the present and last volume were kindly loaned to the committee, without any expense to the Association, by the Publishing Committee of the American Journal of Pharmacy, and also by the American Philosophical Society. We regret, however, to state that two essays read at the meeting had necessarily to be published without the intended illustrations, and with a slight change in the phraseology of those portions referring thereto, the editor being unaware that illustrations were desired until the manuscript had been placed into the printer's hands. While it is conceded that the illustrations would have rendered the subjects more intelligible, still the descriptions of the apparatus and manner of manipulation appeared to be sufficiently clear to comprehend the authors' intentions. It is suggested that such essays, for which illustrations are desirable, be accompanied by a separate note addressed to the Secretary stating this fact, so that he may be enabled to have the cuts prepared without causing delay. It is likewise suggested that authors of papers furnish for the use of the Secretary a separate list of such preparations or samples which they may exhibit before the Association in connection with the essays presented.

The portrait of the late Professor Edward Parrish, which embellishes the present volume, is printed from a steel plate, for the use of which we are in-

debted to our fellow-member, Clemmons Parrish. Those who have known the departed will recognize this as a most faithful likeness.

Considerable trouble is annually experienced, and much correspondence becomes necessary for the Treasurer and Secretary, in consequence of the careless manner in which applications for membership are often handed in to the Executive Committee, some being even signed by proxy, and in the majority of cases the *legible writing of the full name*, or the attachment of a printed slip bearing the full name at the head of the application, being entirely neglected. All members who have candidates to propose are requested to hand the applications to either one of the undersigned at least a week before the meeting, and if the applicant is not likely to be present at the meeting, to accompany the document with the necessary funds.

Another source of trouble to the Secretary arises from the neglect of some members who attend the meetings to register their names. Heretofore that officer has completed the list from memory as well as he could; but with the large number that was present at the last meeting he found that task impossible, and had to invoke the aid of the Local Secretary and Treasurer. But it is believed that even the numerous additions made by these efficient officers failed to record the names of some, perhaps of many, who were present. Attention is therefore called to this matter now, so that incompleteness may be avoided hereafter.

The prices of the "Proceedings" now on hand, *including postage*, have been fixed as follows:

1851, 1852, 1853, 1855, unbound,	\$0 25 each.		
1857,	" 0 50	bound,	\$0 80
1858, 1859,	" 1 50	"	" 1 75 each.
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1862, 1863,	"	"	1 50 "
1864, 1865, 1866,	" 1 50	"	1 80 "
1867,	" 2 20	"	2 50
1868, 1869, 1870,	" 2 50	"	3 00 "
1871,	" 4 50	"	5 25
1872,	" 2 50	"	3 00
1873, 1874,	" 5 00	"	5 50 "
1875,	" 7 00	"	7 50

1854 and 1856, out of print; none published in 1861.

The entire set of bound volumes, the first four in paper covers, will be furnished at \$42; the set of unbound volumes, including the bound ones for 1860, 1862, 1863, are held at \$35. The prices for entire sets are *exclusive of postage or express charges*.

The Twenty-fourth Annual Meeting will be held in the City of Philadelphia, on the second Tuesday of September (12th), 1876, at 3 o'clock P.M.

GEORGE W. KENNEDY,

Chairman of the Executive Committee, Pottsville, Pa.

JOHN M. MAISCH,

Permanent Secretary, 145 North Tenth Street, Philadelphia.

December 16th, 1875.

# List of Members and Delegates

IN ATTENDANCE AT THE TWENTY-THIRD  
ANNUAL MEETING.

---

Aimar, G., Charleston, S. C.	Carter, Solomon, Boston, Mass.
Alden, C. P., Springfield, Mass.	Cary, E. F., Boston, Mass.
Appleton, G. J., Keene, N. H.	Cassebeer, H. A., Jr., New York.
Atkinson, A. J., Newburyport, Mass.	Childs, L. M., Greenfield, Mass.
Babcock, J. F., Boston, Mass.	Chipman, E. D., Philadelphia, Pa.
Babo, Leopold, Boston, Mass.	Close, G. C., Brooklyn, N. Y.
Badger, Charles, Newark, N. J.	Clough, Thomas R., Medford, Mass.
Bailey, Fred., Lowell, Mass.	Colcord, Samuel M., Boston, Mass.
Bain, A. W., Cincinnati, O.	Colton, J. B., Boston, Mass.
Baker, T. R., Richmond, Va.	Congdon, A. J., East Greenwich, R. I.
Balluff, Paul, New York, N. Y.	Connelly, William A., Boston, Mass.
Bartlett, W. W., Boston, Mass.	Cook, G. E., Port Jervis, N. Y.
Bayley, A. R., Cambridgeport, Mass.	Cotton, W. H., Newport, R. I.
Becker, Charles, Georgetown, D. C.	Cowdin, G. H., Somerville, Mass.
Bedford, P. W., New York, N. Y.	Craig, J. S., Neponset, Mass.
Berrian, G. W., Jr., North Andover, Mass.	Creuse, J. L. A., Brooklyn, N. Y.
Bidwell, M. S., Elmira, N. Y.	Cromwell, Z. W., Washington, D. C.
Bingham, C. C., St. Johnsbury, Vt.	Cutler, E. Waldo, Boston, Mass.
Blake, J. E., New Bedford, Mass.	Daggett, A., New Haven, Conn.
Blanding, Wm. B., Providence, R. I.	Daggett, H., New Haven, Conn.
Blunt, Ira W., Richmond, Va.	Dalrymple, C. H., Morristown, N. J.
Boring, E. M., Philadelphia, Pa.	Davidson, Frank A., Boston, Mass.
Bossler, D. J., Philadelphia, Pa.	De la Cour, J. L., Camden, N. J.
Boyden, Ashel, Boston, Mass.	Diehl, C. L., Louisville, Ky.
Boyden, Edward C., Boston, Mass.	Dobbins, E. T., Philadelphia, Pa.
Boynton, H., Biddeford, Me.	Dohme, L., Baltimore, Md.
Brown, A. P., Camden, N. J.	Doliber, Thos., Boston, Mass.
Brown, Joseph T., Boston, Mass.	Doolittle, Erastus H., Boston Mass.
Brown, Joseph T., Jr., Boston, Mass.	Drake, Charles W., Middleboro', Mass.
Buck, John, Chelsea, Mass.	Drury, Linus D., Boston, Mass.
Bullock, Charles, Philadelphia, Pa.	Duble J., Williamsport, Pa.
Burnham, George H., Boston, Mass.	Dupuy, P. E., Richmond, Va.
Burnett, Joseph, Boston, Mass.	Dyer, J. H., Boston, Mass.
Bush, William, Worcester, Mass.	Eareckson E., Baltimore, Md.
Butler, F. H., Lowell, Mass.	Eastman, C. S., Concord, N. H.
Calder, A. L., Providence, R. I.	Easton, L. W., Rockland, Mass.
Campbell, H. W., New York.	Eaton, Charles I., Boston, Mass.
Candidus, P. C., Mobile, Ala.	Eberle, Ch. L., Philadelphia, Pa.
Canning, Henry, Boston, Mass.	Eimer, Charles, New York, N. Y.
	Estes, J. J., Rockland, Mass.

**LIST OF MEMBERS AND DELEGATES IN ATTENDANCE. 23**

<b>Fairchild, B. T., New York.</b>	<b>Kennedy, George W., Pottsville, Pa.</b>
<b>Fehr, Julius, Hoboken, N. J.</b>	<b>Kent, R. R., Boston, Mass.</b>
<b>Fish, C. F., Saratoga Springs, N. Y.</b>	<b>Kettell, George P., Boston, Mass.</b>
<b>Flanagan, Lewis C., Somerville, Mass.</b>	<b>Kidder, Samuel, Jr., Lowell, Mass.</b>
<b>Folger W. S., Boston, Mass.</b>	<b>King, A., Buffalo, N. Y.</b>
<b>Follansbee, Sherman, Boston, Mass.</b>	<b>King, J. T., Middletown, N. Y.</b>
<b>Foster, H. B., Concord, N. H.</b>	<b>Knowlton, A. M., Troy, N. Y.</b>
<b>Fowle, Henry D., Boston, Mass.</b>	<b>Koehnken, H. H., Cincinnati, O.</b>
<b>French, George W., Boston, Mass.</b>	<b>Lane, A. S., Rochester, N. Y.</b>
<b>Frothingham, E. G., Jr., Haverhill, Mass.</b>	<b>Leary, J. T., Boston, Mass.</b>
<b>Fuller, S. H., Boston, Mass.</b>	<b>Lee, A. S., Raleigh, N. C.</b>
<b>Gaither, F. S., Washington, D. C.</b>	<b>Lee, Emmor H., Camden, N. J.</b>
<b>Gardner, R. W., Jersey City, N. J.</b>	<b>Lehlbach, P. F., New York, N. Y.</b>
<b>Gordon, W. J. M., Cincinnati, O.</b>	<b>Lehn, L., New York, N. Y.</b>
<b>Greene, G. E., Wyoming, R. I.</b>	<b>Leis, G., Lawrence, Kan.</b>
<b>Gregory, E. Lindsay, Ontario, Can.</b>	<b>Lemberger, J. L., Lebanon, Pa.</b>
<b>Griswold, W. H., North Adams, Mass.</b>	<b>Lewis E. C., Rutland, Vt.</b>
<b>Harwood, L., Warren, Mass.</b>	<b>Lillard B., Nashville, Tenn.</b>
<b>Harwood, F. L., Warren, Mass.</b>	<b>Littlefield, Alvah, Boston, Mass.</b>
<b>Haviland, H., New York, N. Y.</b>	<b>Livingston, B. B., Brooklyn, N. Y.</b>
<b>Hays, David, New York, N. Y.</b>	<b>Lowd, John C., Boston, Mass.</b>
<b>Hay, H. H., Portland, Me.</b>	<b>Luhn, G. J., Charleston, S. C.</b>
<b>Heimstreet, B., Janesville, Wis.</b>	<b>Lyman, S. I., Montreal, Can.</b>
<b>Heinitsh, C. A., Lancaster, Pa.</b>	<b>Macmahan, T. J., New York, N. Y.</b>
<b>Henchman, Daniel, Boston, Mass.</b>	<b>Main, Thomas F., New York, N. Y.</b>
<b>Hildreth, C. F., Suncook, N. H.</b>	<b>Maisch, J. M., Philadelphia, Pa.</b>
<b>Hinsdale, S. J., Fayetteville, N. C.</b>	<b>Markoe, G. F. H., Boston, Mass.</b>
<b>Hitchcock, W. E., Newark, N. J.</b>	<b>Marvin, Thomas E. O., Portsmouth, N. H.</b>
<b>Hoagland, P. R., Boston, Mass.</b>	<b>Masi, F. H., Norfolk, Va.</b>
<b>Hoffmann, Fr., New York, N. Y.</b>	<b>Mason, N. N., Providence, R. I.</b>
<b>Holmes, C. W., Wilkesbarre, Pa.</b>	<b>Mattison, R. V., Philadelphia, Pa.</b>
<b>Holzbauer, C., Newark, N. J.</b>	<b>McDonald, W. W., Boston, Mass.</b>
<b>Hood, C. T., Lowell, Mass.</b>	<b>McInall, E., Jr., Wilmington, Del.</b>
<b>Horton, W. F., Boston, Mass.</b>	<b>McIntyre, Ewen, New York, N. Y.</b>
<b>Hoyt, George M., Boston, Mass.</b>	<b>McIntyre, William, Philadelphia, Pa.</b>
<b>Hubbard, J. H., Cambridge, Mass.</b>	<b>Melvin, James S., Boston, Mass.</b>
<b>Hunt, J. L., Hingham, Mass.</b>	<b>Mercein, J. R., Jersey City, N. J.</b>
<b>Hyler, W. H., Port Chester, N. Y.</b>	<b>Metcalf, Theodore, Boston, Mass.</b>
<b>Jarrett, H. T., New York, N. Y.</b>	<b>Merrill, Walter S., Danvers, Mass.</b>
<b>Jenkins, L. L., Boston, Mass.</b>	<b>Meyer, C. F. G., St. Louis, Mo.</b>
<b>Jenks, Thomas L., Boston, Mass.</b>	<b>Meyers, E. T., Columbia, Pa.</b>
<b>Jennings, N. H., Baltimore, Md.</b>	<b>Meyers, J. W., Bethlehem, Pa.</b>
<b>Jones, Alex. H., Philadelphia, Pa.</b>	<b>Michaelis, C., Charleston, S. C.</b>
<b>Jones, E. C., Philadelphia, Pa.</b>	<b>Milburn, John A., Washington, D. C.</b>
<b>Jones, W. H., Boston, Mass.</b>	<b>Miller, A. W., Philadelphia, Pa.</b>
<b>Jones, S. N., Louisville, Ky.</b>	<b>Miller, G. Y., Luzerne, N. Y.</b>
<b>Kay, I. H., Philadelphia, Pa.</b>	<b>Molwitz, E., New York.</b>
<b>Kelley, E. S., Boston, Mass.</b>	<b>Neergaard, William, New York.</b>

## 24 LIST OF MEMBERS AND DELEGATES IN ATTENDANCE.

Nichols, E. P., Newark, N. J.	Shinn, James T., Philadelphia, Pa.
Noble, S. J., Newton Centre, Mass.	Shryer, T. N., Cumberland, Md.
Oatman, L. R. G., Angola, N. Y.	Simpson, W., Raleigh, N. C.
Orne, Ch. P., Cambridgeport, Mass.	Smalley, Elijah, Boston, Mass.
Orne, Joel S., Cambridgeport, Mass.	Snow, J. W., Boston, Mass.
Paine, M. K., Windsor, Vt.	Stacey, B. F., Charlestown, Mass.
Palmer, J. D., Monticello, Fla.	Starr, T., New York.
Parcker, G. A., Ellsworth, Me.	Stein, J. H., Reading, Pa.
Parker, J. L., Boston, Mass.	Stephens, W. G., Yonkers, N. Y.
Partridge, C. K., Augusta, Me.	Talbot, James S., Boston, Mass.
Patch, E. L., Boston, Mass.	Taylor, J. P., New Bedford, Mass.
Patten, I. B., Boston, Mass.	Taylor, J. H., Newport, R. I.
Pauknin, C. F., Charleston, S. C.	Thayer, Henry, Cambridgeport.
Peixotto, M. L. M., New York.	Thomas, J., Jr., Nashville, Tenn.
Peters, A. C., Newark, N. J.	Thompson, W. S., Baltimore, Md.
Phillips, F. J., Providence, R. I.	Thorn, J. M., Brattleboro, Vt.
Phipps, J. M., Munsen, Mass.	Tower, Levi, Jr., Boston, Mass.
Pile, W. H., Philadelphia, Pa.	Townly, William M., Newark, N. J.
Pinkham, A. T., Dover, N. H.	Tozzer, S. C., Lynn, Mass.
Plaisted, James H., Waterville, Me.	Trash, C. M., Boston, Mass.
Plummer, G. B., Hinsdale, Mass.	Tucker, Frank, Boston, Mass.
Rackley, B. F., Dover, N. H.	Tufts, Charles A., Dover, N. H.
Ramsperger, G., New York.	Underhill, G. F., Concord, N. H.
Randall, G. D., St. Johnsbury, Vt.	Vandergrift, J. A., Burlington, N. J.
Reinold, B. H., New York.	Vandervoort, R. W., Newark, N. J.
Restieaux, Thomas, Boston, Mass.	Vickery, W. H., Dover, N. H.
Rice, Charles, New York.	Wakefield, S. D., Lewiston, Me.
Ricker, G. D., Boston, Mass.	Watwood, H., New York.
Rideout, J. W., East Boston, Mass.	Webster, S., Boston, Mass.
Rittenhouse, H. N., Philadelphia, Pa.	Wellcome, H. S., New York.
Robbins, A., Philadelphia, Pa.	Wells, J. D., Cincinnati, O.
Roberts, Joseph, Baltimore, Md.	Wendel, H. E., Philadelphia, Pa.
Rogers, W. H., Middletown, N. Y.	Whall, J. L., Boston, Mass.
Royce, L. M., New York.	Wheeler, C. G., Chicago, Ill.
Runyon, E. W., New York.	White, A. J., Mt. Holly, N. J.
Russell, E. W., Baltimore, Md.	Whiting, F. T., Great Barrington, Mass.
Rust, W., New Brunswick, N. J.	Whitman, N. G., Hudson, Mass.
Safford, W. A., Lowell, Mass.	Wiegand, Thomas H., Philadelphia.
Saunders, W., London, Ont.	Willard, J., Chicago, Ill.
Scheffer, Emil, Louisville, Ky.	Wilder, F. W., Ware, Mass.
Sears, George T., Boston, Mass.	Wild, J. O., Holyoke, Mass.
Sewall, David J., Boston, Mass.	Wilkins, D. G., Boston, Mass.
Sharples, S. P., Boston, Mass.	Williams, J., Worcester, Mass.
Shaw, R. J., Plainfield, N. J.	Williams, J. K., Hartford, Conn.
Shead, E. E., Eastport, Me.	Wilson, B. O., Boston, Mass.
Sheppard, S. A. D., Boston, Mass.	Winter, J., Hagerstown, Md.
Sherman, L. E., Ludlow, Vt.	Young, J. E., Vergennes, Vt.
Sherwood, H. S., Poughkeepsie, N. Y.	



**PROCEEDINGS**  
**OF THE**  
**TWENTY-THIRD ANNUAL MEETING**  
**OF THE**  
**American Pharmaceutical Association.**

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**REPORT ON THE PROGRESS OF PHARMACY,**  
**FROM JULY 1, 1874, TO JUNE 30, 1875.**

**BY C. LEWIS DIEHL.**

THE report submitted to you in the following pages will be found a more accurate exhibit of pharmaceutic progress than any I have hitherto had the honor to submit for your approval. The report of 1874 was made under peculiar difficulties and embarrassments, and hence quite a number of foreign journals remained unextracted. This omission has been made good in this year's report, which contains much that has appeared in the British and German journals between January and July, 1874. The immense amount of material furnished makes it necessary that the report should be restricted to observations that bear particular relation to pharmacy, and it has been my aim to so restrict it. Questions of a purely scientific or therapeutic character have been either omitted altogether or are simply referred to, while practical pharmaceutic papers have been extracted more in detail; and of this latter class the report will make a very thorough ex-

hibit. The arrangement is the same as heretofore. The nomenclature is that of the Pharmacopœia. Chemical notation is quoted as in the original papers, but when such is based upon the modern theory, it is indicated by the affix (O—16). Thermometric degrees are also given as by the author, but whenever of the Centigrade or Reaumur scale, the corresponding degrees of Fahrenheit's scale are uniformly appended.

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## PHARMACY.

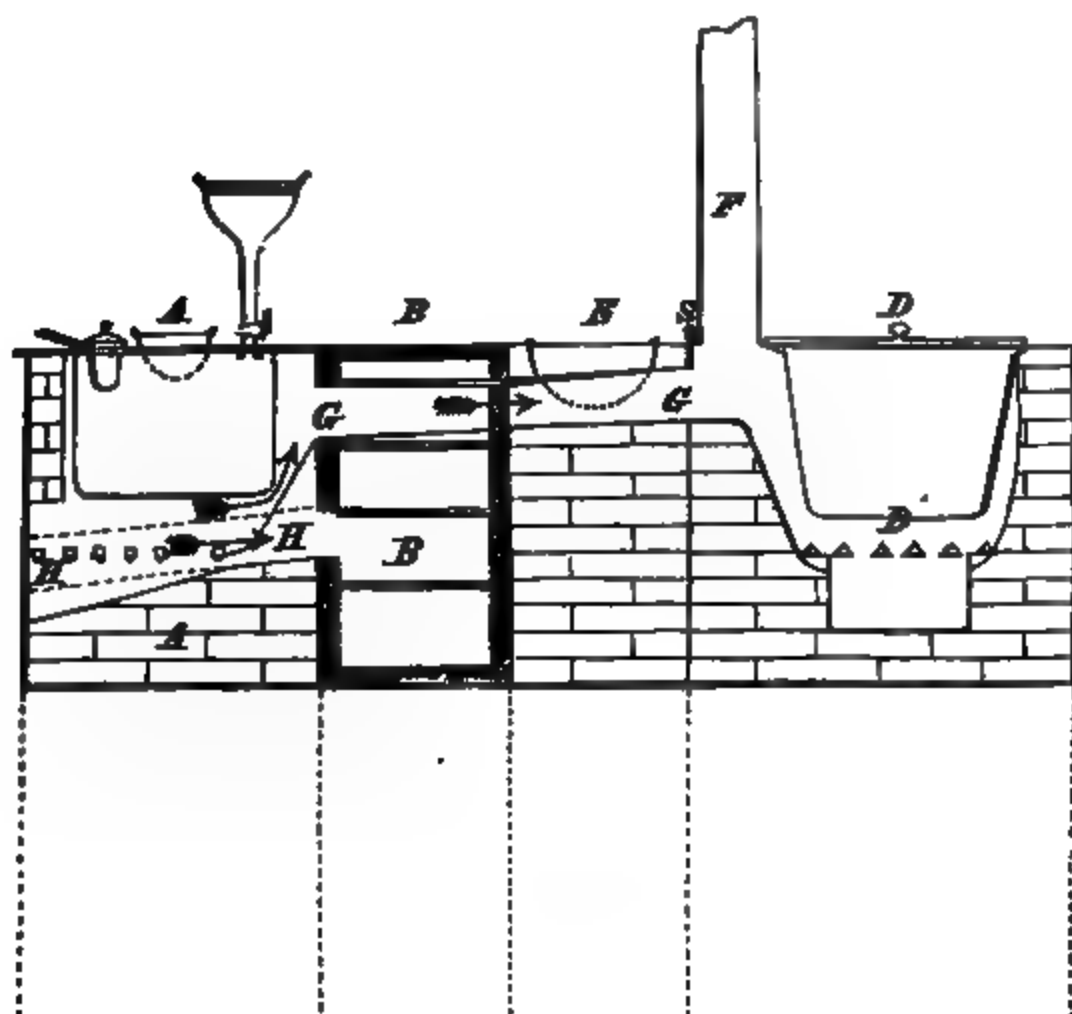
### APPARATUS. •

*General Apparatus for the Pharmaceutic Laboratory.*—Dr. L. Enders gives the following description of a general apparatus, which he has used in his own laboratory for a number of years (see Figs. 1 and 2): The apparatus is longer than broad, the front being taken up by the steam apparatus (*A*). Back of this is the drying closet (*B*), covered on top by a stone tile, in such manner as to be even with the top of the steam apparatus. Behind the drying closet is situated, on the one side, an ordinary hearth for a wood-fire (*C*), and on the other a sand-bath (*E*), which is walled in; and again back of this, a larger furnace, for the movable kettle (*D*). The flue for *all* of the furnaces is a wide tube of sheet-iron, as shown in Fig. 1, and which passes vertically through the ceiling into the chimney. The drying closet is heated by the flue of the steam apparatus (*G*) and two air-flues (*H*), which are placed alongside the fire chamber of the apparatus, and separated from it by means of cast-iron plates, the heat being regulated by slides of sheet-iron provided at the front of the apparatus. The apparatus may, of course, be modified to suit the requirements of the business. Arch. Ph., March, 1875, p. 254.

*A New Gas-burner* has been constructed by Stöckmann, which he recommends highly as a substitute for Bunsen's

burner, when high heat is desirable, and the pressure of gas is insufficient (as is often the case in cities during daylight).

FIGS. 1 AND 2.



The apparatus is shown in Fig. 3, a vertical section, and Fig. 4, a horizontal view. The tube *a*, Fig. 3, slides in the tube *b*, both of which are constructed of ordinary wrought-iron gas-pipe. The tube *a* may be raised or lowered at will, being

kept in position by the small screw *c*. The outer tube, *b*, is provided with four feet, *d*, which are constructed by sawing the tube into four equal parts, in the direction of its axis, to fully two-thirds of its length, shaping these with a chisel and file, as shown in Fig. 3, and screwing them on the wooden block, *f*, as shown in Fig. 4. The gas is supplied by means of the properly shaped glass tube, *g*, to which a caoutchouc

FIGS. 3 AND 4.

!

A-----

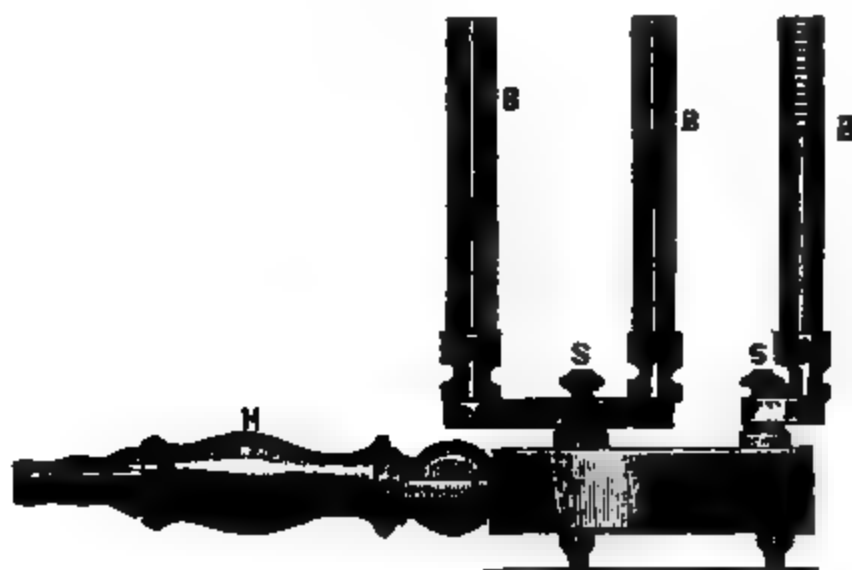
B

tube is attached, and which is fastened into the block by means of ordinary putty. The supply of air is regulated by raising or lowering the tube *a*. The scale of the illustrations is one-fourth the actual size, and the apparatus may readily be constructed at a small expense. *Zeitschr. Anal. Ch.*, No. 1, 1874, p. 27.

*New Universal Gas-burner.*—Joseph Rabe has constructed a new gas-burner, which is illustrated in the accompanying

cuts, Fig. 5 and Fig. 6. The apparatus consists of a combination of three Bunsen's burners (*B*), which are fastened upon a common base (*F'*) in such manner that each one, being at-

FIGS. 5 AND 6.

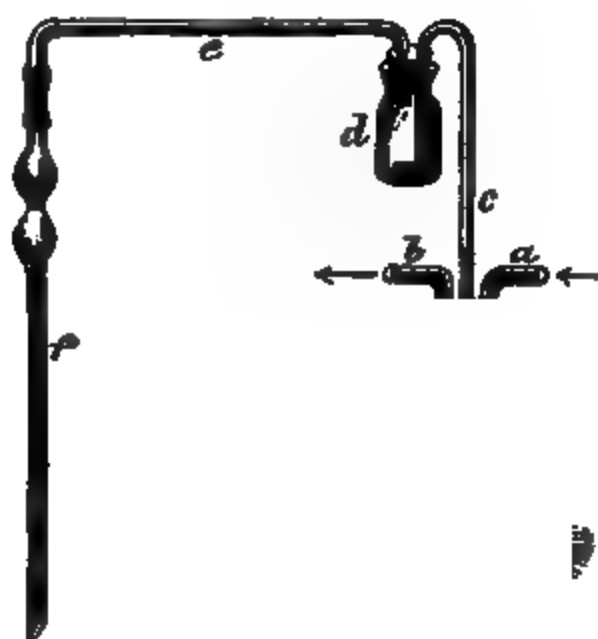


tached to an arm (*A*), may be turned in a circle. The arms are fastened into the base by means of conical plugs, being kept secure by means of spiral springs in the interior of the base, and which, while air-tight, permit turning very readily. To facilitate the use of a single burner, as well as two, or all, each one of the arms is provided with a small screw (*S*) immediately over the plug, by means of which the flow of gas may be reduced or turned off completely. The gas flows into the hollow base through the handle (*H*), which consists of an ordinary gas-tube suitably covered with wood, and facilitates the removal of the apparatus while in operation. A number

of useful purposes to which such an apparatus can be applied will readily suggest themselves. *Zeitschr. Anal. Ch.*, No. 3, p. 304.

*An Apparatus* for preventing the evaporation of liquids beyond a certain point, when gas is used as the source of heat, has been constructed by E. Geyer, which seems to be both practical and useful, and is illustrated in Fig. 7. The flask,

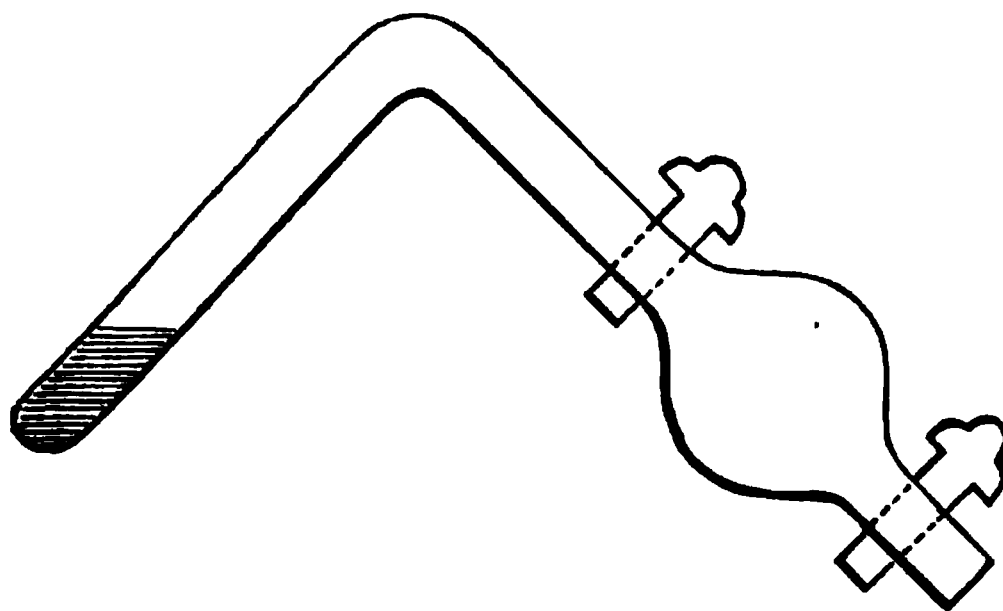
FIG. 7.



*g*, is of the capacity of 125 c.c.; the supply of gas enters through the tube, *a*, and passes through *b* to the burner. Water is placed into *g*, so that the lower end of *b* is stopped completely; air is then blown in through *b*, which raises a portion of the water through the siphon, *c*, into the flask, *d*, and the gas will then flow uninterruptedly through *b* if the air is excluded from *d* by dipping the tube, *f*, into water or other liquid. As soon as air is allowed to pass in at *f*, the water from *d* passes back into *g*, and the flow of gas through *b* ceases. It becomes plain, therefore, that if the tube, *f*, is dipped into the evaporating fluid to the point to which it is desirable to evaporate, the moment that point is reached, air will enter, and the flow of gas is stopped. The arrangement serves an excellent purpose to prevent water-baths from becoming dry. *Zeitschr. Anal. Ch.*, No. 2, 1875, p. 166.

*A New Apparatus* for the condensation of ammonia or chlorine has been devised and is recommended by Sergius Kern, the apparatus possessing the advantage over the sealed tube recommended by Faraday, in serving for an indefinite number of experiments. It consists of a strong bent tube, as shown in Fig. 8, one end being sealed, and the other formed

FIG. 8.



into a sphere having two cocks, one on each side of the sphere. In order to obtain either of these condensed gases, chloride of silver saturated with ammonia, or hydrate of chlorine ( $\text{Cl}_5\text{H}_2\text{O}$  ( $\text{O}=16$ )), is introduced into the sealed end of the tube through the cocks. The cocks being then closed, the operation is conducted in the usual manner. Chem. News, October 9th, 1874, p. 169.

*An Apparatus* for the continuous generation of chlorine is constructed and applied by A. Mermet as follows: Two flasks, provided with tubules near the bottom, are united by means of a rubber tube. Into one of these flasks a layer of powdered glass is placed, and on this a layer of balls of chlorinated lime, of the size of a walnut, prepared by kneading chlorinated lime with water, forming into the proper shape, and drying in the air. This flask is provided with a perforated caoutchouc stopper, into which the exit-tube for the gas is fitted, to which a caoutchouc tube, provided with a clamp, is attached. The other flask contains a mixture of three parts concentrated muriatic acid and one of water. On opening the

clamp, the acid liquid from the second passes into the first, and causes a gradual and regular evolution of chlorine. To deprive this of carbonic acid, which the chlorinated lime generally contains, it is passed through a tube filled with dry chlorinated lime. Ch. Centralbl., No. 82, p. 497; Bull. Soc. Chim.

A *Water-bath*, in which the height of the water can be regulated and kept constant, is recommended by Robert Muencke, and illustrated in Fig. 9. The supply-tube, near the bottom

FIG. 9.

of the bath, is provided vertically with a tube of larger dimensions, which serves to hold a glass water-gauge at its upper extremity, and, being narrowed in calibre at its lower



extremity, is fitted with a small metallic bend-tube which admits of being raised or lowered, and serves as the exit-tube. The water-gauge is held in position by a metallic arm near the top of the water-bath, and is loosely provided with a bend-tube, connected with the water supply. The latter is readily regulated so as to replace that which evaporates, and if it should be in excess, will overflow through the exit-tube, and thus keep the water at the desired height. The apparatus may, of course, be constructed of any desired shape. *Ph. Centralhalle*, No. 40, 1874, p. 334.

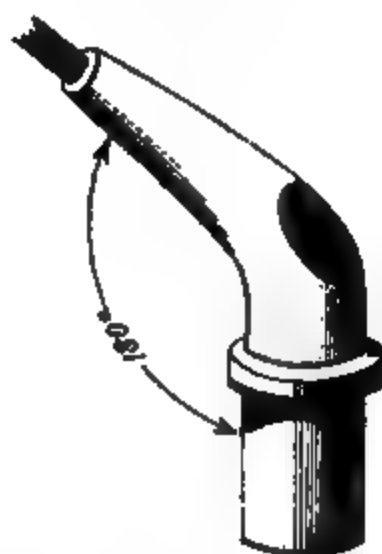
*A Containing Vessel for the Facile Use of Hydrofluoric Acid* in the laboratory, is proposed by G. Foord. It consists of the ordinary gutta-percha bottle in which the commercial hydrofluoric acid is commonly supplied, converted by the appliances (illustrated in Figs. 10, 11, 12, 13), into a burette, from which the acid may be poured with precision, drop by drop, or in a thin stream, as may be desired. The burette piece is formed

FIG. 10.

FIG. 11.

FIG. 12.

FIG. 13.



out of gutta-percha tube, of a diameter sufficiently small for entering easily into the neck of the bottle. About  $2\frac{1}{2}$  inches of such tube is cut off, and slid down in such manner as to remove two wedge-shaped segments from either side of its diameter. A cylindrical piece of wood, of about  $\frac{1}{8}$ th of an inch in diameter, is now provided, and placed within the cut of the tube, which latter is warmed and softened before a stove,

and the two cut edges pressed together give to the tube a conical upper termination. A welt of gutta-percha, softened and applied round the warmed tube a little below the base of the conical portion, forms a flange for fitting down against the spreading top of the bottle-neck. The cone is now warmed and carefully bent over to an angle of about  $130^{\circ}$  with the vertical portion, and when cold and rigid, with a cork-cutter a circular perforation is made at the upper side of the bend. A piece of the same ( $\frac{1}{2}$  inch) gutta-percha tube, say  $\frac{3}{4}$  inch long, is split and reunited by heat so as to become slightly conical, and is then united by its smaller end to the perforated part of the bend. A stopper for this is made by splitting a piece of tube, warming it, and then rolling the flattened piece upon itself; shaping the lower end and flattening and flanging the upper portion. A piece of stout platinum-foil is formed into a tube about  $\frac{1}{8}$ th inch in diameter, the seam being readily soldered with gold-foil in the flame of a blowpipe. This is inserted into the end of the gutta-percha burette piece, and caused to adhere by warming; the piece itself is to be adapted to the bottle by a layer of wax, kneaded until soft, and pressed under the flange. Similarly the stopper is fixed in with an interposed layer of wax; and a ball of wax may be used for closing the tubules when the vessel is set aside. A loose outer case of tin-plate, reaching up to the shoulder of the gutta-percha bottle, with a cork wedge for fixing the latter, makes the arrangement completely secure, and it can be used with the same facility as any other reagent bottle; a single drop of hydrofluoric acid can at any moment be obtained. The stopper allows access to the interior without disturbing the joint at the neck. The author describes and recommends this arrangement so as to induce the more frequent use of this acid, which is so necessary to many laboratory operations, yet so often avoided on account of the known danger from its accidental contact with the skin of the operator. Chem. News, October 23d, 1874, p. 191.

*Tin-lined Vessels.*—Fordos recommends the following method for detecting even the smallest quantities of lead in the tin lining of vessels. The surface having been cleansed per-

fectly, apply by means of a tube dipped in nitric acid, a slight layer of acid, selecting by preference the thickest part. Both metals are attacked, stannic oxide and nitrate of lead being formed. Heat is applied to drive off the last traces of acid, and, when cool, the pulverulent spot is touched with a tube dipped in a solution of 5 parts of iodide of potassium in 100 parts of water. If lead is present, the yellow-colored iodide of lead becomes evident. Stannic oxide is not affected by the iodide solution. Care must be taken that the acid does not penetrate to the iron or copper which forms the body of the vessel, as the reaction might thus be complicated. *Ch. News*, April 30th, 1875, p. 196 ; *Comp. Rend.*, March 29th, 1875.

*Gold-lined Platinum Vessels* are recommended by J. Lawrence Smith as very useful in caustic potash and nitre operations. They are constructed from sheets of platinum upon which a layer of gold is welded, by melting a suitable quantity of the latter metal upon a thick sheet of platinum, and rolling it out to a suitable thickness. Some difficulty experienced in making the first vessels, has been overcome by Johnson, Matthey & Co., of London.. *Chem. News*, February 5th, 1875, p. 55.

*Bohemian Glass Vessels.*—P. Truchot makes a remarkable statement in regard to Bohemian glass vessels. These vessels, beakers, flasks, etc., otherwise well adapted to alkaline determinations, become a source of error in consequence of yielding a portion of their alkaline component to boiling water. At least this is the case with some glasses brought from Germany, and sold at Nancy in 1873 and 1874. This fact may be shown by boiling in a flask pure water mixed with tincture of red cabbage or syrup of violets slightly reddened by an acid. After boiling for a few minutes the liquid turns green. French glasses, with a base of soda, are not sensibly attacked, and therefore do not offer this inconvenience. *Chem. News*, January 15th, 1875, p. 30 ; *Comp. Rend.*, December 14th, 1874.

*A Convenient Decanting Jar*, for precipitates that are very easily disturbed, is recommended by A. Gawalovski, and illustrated by Figs. 14 and 15. The illustration explains the

FIG. 14.

FIG. 15.

construction as well as the method of using it. The normal position of the tube *B*, is at  $\alpha$ . When the precipitate has sufficiently subsided it is brought to the position  $\beta$ , and then very gradually according to circumstances, to the position  $\gamma$ , and finally to  $\delta$ , when it acts as a siphon, and draws off the liquid to near the bottom of the decanting jar. *Zeitsch. Anal. Chem.*, No. 1, 1874, p. 29.

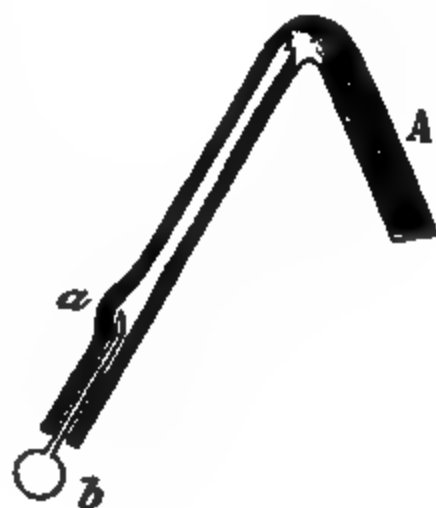
*Wash-Bottle*.—The accompanying sketch (Fig. 16) shows a form of wash-bottle, recommended by G. Foord, and possesses advantages in the arrangement of the jet-tube and the mouth-piece over those ordinarily constructed. The drawing requires little explanation. The jet-tube is fixed into the socket of the supply-tube by means of a soft cork, and permits being set in any position desirable. The mouthpiece-tube is blown into a trap, which prevents contamination of the distilled water during use. The manner of constructing this part will become intelligible by the drawing. *Ch. News*, October 23d, 1874, p. 192.

FIG. 16.

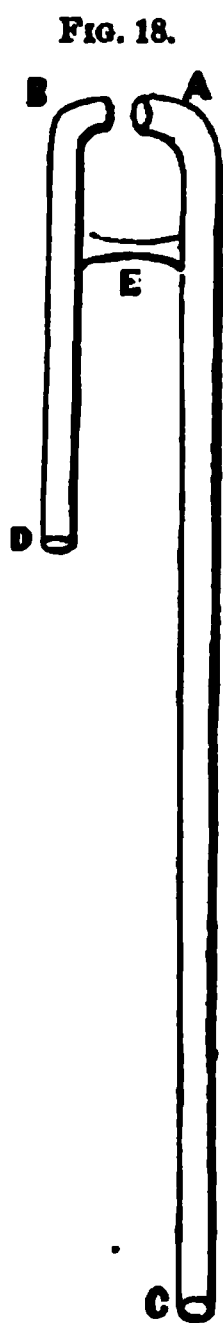


A *Siphon*, very useful for continuous filtration, is described by A. Gawalovski. It consists of a common siphon-tube *A*, which at *a* is inflated. An ordinary, empty, thermometer-bulb is cut to the proper length, and provided at the tube end with a little hook, so that when it is inserted into the tube it will not readily fall out. The little bulb acts as a float, rising with the liquid on the filter until it finally stops the flow, and falling again as the liquid passes through the filter, etc. (See Fig. 17.) *Zeitschr. Anal. Ch.*, No. 2, 1875, p. 171.

FIG. 17.



*Poison Siphon.*—The illustration (Fig. 18) shows a poison siphon, recommended by R. H. Ridout. It consists of two



pieces of glass tube, A C, and B D, of about  $\frac{1}{8}$ th inch bore. They are held at a distance of about  $1\frac{1}{2}$  inches apart by the piece E, and are united at their bent extremities by means of a rubber tube, provided with a pinch-cock. When used it is filled with water, the pinch-cock being closed until introduced into the liquid to be decanted. The calibre being small, there is no danger of any of the water flowing from the open end until the pinch-cock is opened. If the liquid to be decanted is to be kept separate from the water originally introduced into the siphon, the pinch-cock is opened for a moment before introducing it into the liquid, and the air-space thus produced effectually keeps the two liquids separate until all the water has passed out at C. Ch. News, October 30th, 1874, p. 205.

*Hydrometers for Special Purposes.*—Dr. Wilson H. Pile, in a paper read at the last annual meeting of this Association, gives full directions for constructing hydrometers for particular purposes; such, for instance, as will indicate the arbitrary sp. gr. of a solution that is being evaporated to a definite strength, etc. See Proceedings, 1874, p. 366.

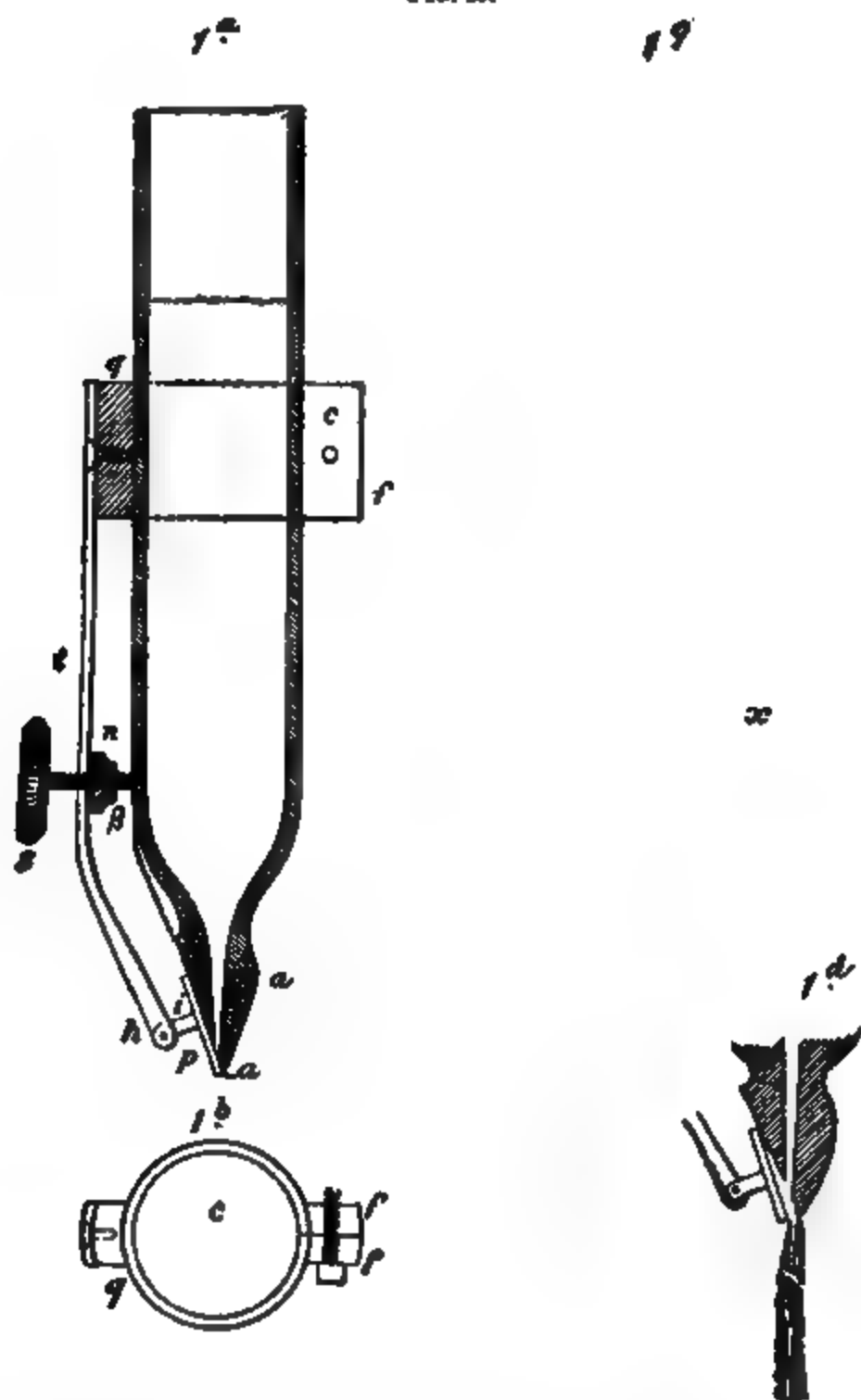
*Modification of Combustion-tube.*—Dr. C. J. Keyser modifies the combustion-tube, for ultimate analysis, by not drawing one end into a point; he only closes it with a cork provided with a glass tube drawn to a point. In this way he saves the combustion-tube, which, with care, can serve for several operations. Farm. Tidskr., 1873; A. J. Ph., June, 1875, p. 262.

*Improved Burette Valve.*—The accompanying cuts illustrate an improvement of the burette valve, by G. A. Koenig.

1. *The burette.* A Mohr's burette, as it is furnished to the trade, is heated at the inflated part of the neck over a Bunsen flame, at a dull-red heat, until the channel has become capillary, as shown in cuts 1 a, 1 c, and 2 a, of Figs. 19 and 20. The

one-half of the inflation is then ground off (upon an ordinary rotary grindstone) at a steep angle. The orifice is not required

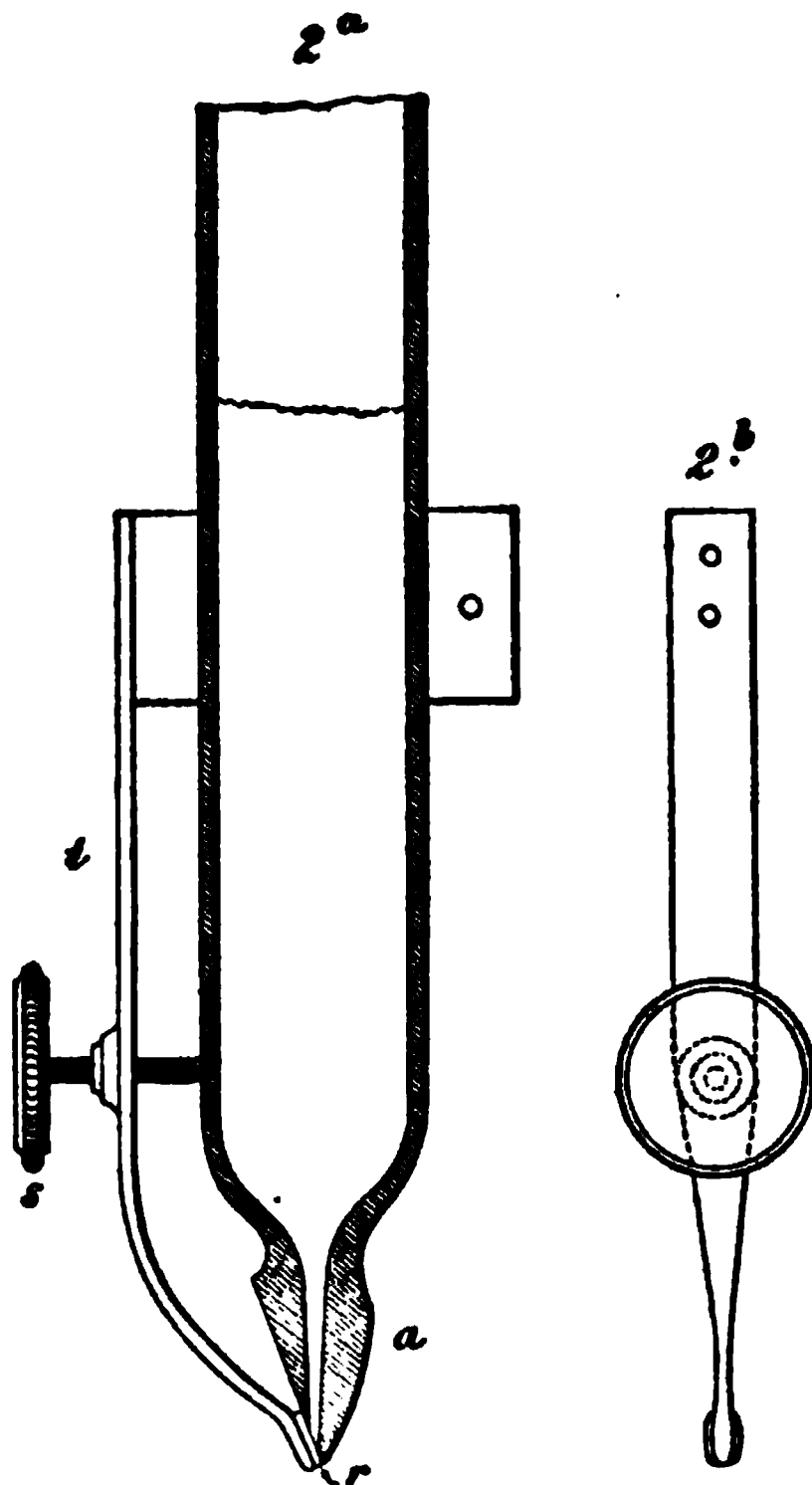
FIG. 18.



to have a definite size, and is naturally given by the points  $\alpha$ ,  $\beta$ . The grinding is continued until the elliptic section of the channel has come with its lowest point from about  $\frac{1}{8}$ th to  $\frac{1}{4}$ th of an inch above the lowest point of the inclined ground plane, absolute planeity of which is not required. The sides

and back are next ground, to produce a point, which is necessary for the letting out of small drops of liquid. The ground face stands at right angles to the graduation, either on the right or left side, as may be desired. 1c represents a front

FIG. 20.



view of the ground face, with the capillary orifice at *o*, the size of the opening depending upon the work to be done.

2. *The valve* consists of a platinum plate, *p*, of elliptical shape  $\frac{3}{8}$ th and  $\frac{1}{8}$ th of an inch being the respective parameters. Thickness about  $\frac{1}{32}$ d of an inch. To the centre of this plate is soldered the platinum stem, *i*, the end of which is pierced by an eye. The spring, *t*, made of brass or German silver, platinated, is screwed to the clamp *c*, and has a fork at its other end for the insertion of the platinum stem *i*, forming thus the

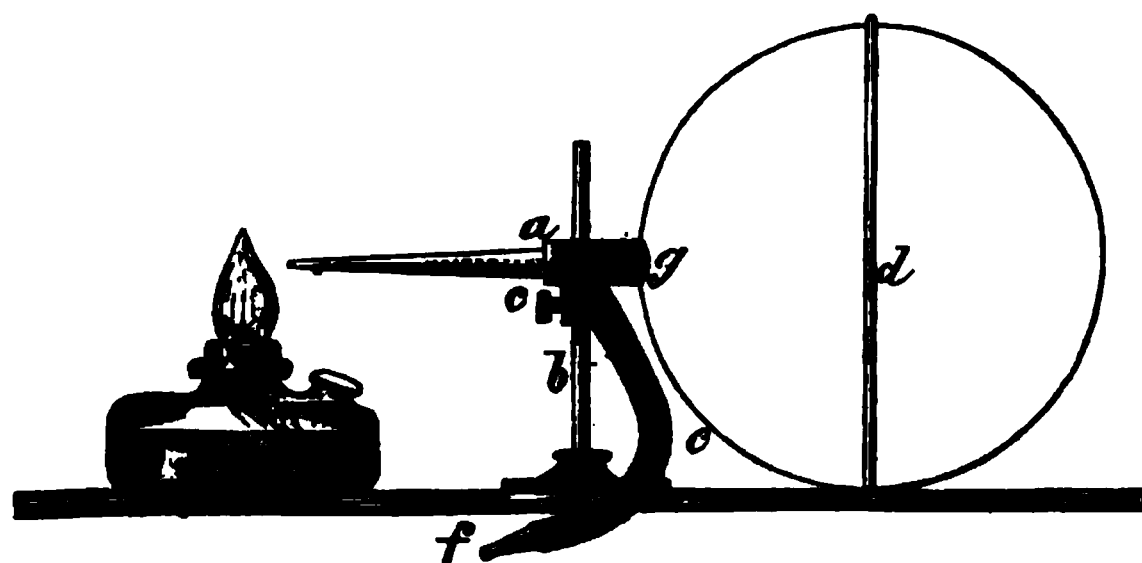


hinge *h*. It carries a nut, *n*, through which the screw *s* passes. In order to open the valve, the screw-head is turned, when the screw-bolt comes into contact with the glass tube and forces the spring backward. The valve plate assumes then a position as represented by cut 1*d*, allowing a full stream to run straight downwards, without the least splashing. The capillary orifice being elliptical, with its long axis parallel to the stream, it is evident that by reversing the screw the orifice will close gradually, the lower point the last, allowing a complete regulation, and when once reduced to dropping, a quarter of a turn of the screw will close totally. Cut 1*b* represents the clamp *c*, which is made of brass tubing, with the flanges *f f* and the block *g* soldered on.

A simple contrivance is illustrated by the cuts 2*a* and 2*b* (Fig. 20) in which the platinum stem and plate are dispensed with, the orifice being closed by a piece of rubber sheeting, as seen at *r*. The lower part of the spring may be coated with platinum, but a coating of rubber resists the action of strong acids very well, and may be reapplied from time to time as it may be necessary, the author using concentrated chloroformic solution for this purpose. *Am. Jour. Pharm.*, June, 1875, p. 279; from *Proc. Am. Phil. Soc.*, 1874.

*Blowpipe*.—A modification of the blowpipe is proposed by Josef Rabs, as illustrated by Fig. 21. An ordinary blowpipe

FIG. 21.



point is attached to the upright (*b*) by means of the clamp (*c*), which permits of being raised or lowered to a convenient height. Instead of the ordinary blowing-tube, a gum tube

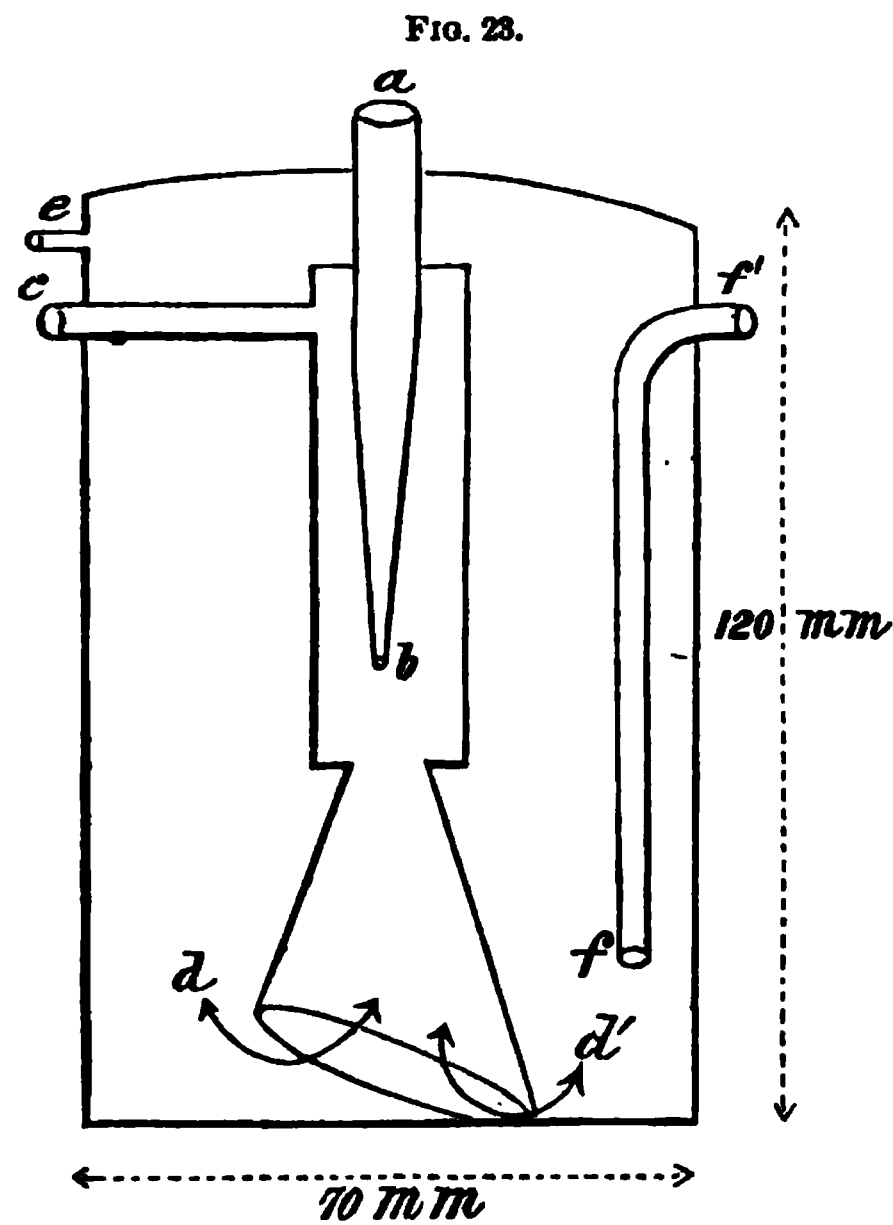
(*e*) with a mouthpiece (*f*) of glass or bone is attached, as seen in the illustration, which permits operating in any position desirable. In order to secure a regular current, a small rubber balloon is attached to the water-sack (*g*); the balloon being surrounded by a tin globe, to protect it against too great pressure and sparks. A simple gum valve (*e. g.*, a so-called Bunsen's valve) prevents the air from returning to the gum tube. *Zeitschr. Analyt. Chemie*, No. 4, 1874, p. 444.

A *Water Blowpipe* has been constructed by D. O. Knublauch, and is illustrated by Figs. 22 and 23. Water is allowed to flow into the apparatus at *a*, and passing through the contracted tube at *b* carries air with it, which is freely admitted at *c* and under pressure passes into the main body of the ap-

FIG. 22.

paratus at *d d'*, and thence at *e*, through a rubber hose connected with the blowpipe. The water passes out at *f f'*. The dimensions indicated in Fig. 23 make a very convenient apparatus, but it may be enlarged *ad libitum*. The water supply must be turned on carefully, and may be regulated according to the force of the desired current. By allowing *e* to remain

open, and attaching the hose to *c*, it may be used to create a partial vacuum, and is, therefore, very useful to facilitate fil-



tration, the drying of precipitates, etc. Zeitschr. Analyt. Chemie, No. 2, 1875, p. 168.

ACIDA.

*Arom. Sulphuric Acid.*—Mr. S. Whittier proposes the following improved formula:

R. Sulph. Acid, C. P.,	. . . . .	℥vj.
Alcohol, 95 per cent.,	. . . . .	℥j.

Mix, and when cool add the following:

Ol. Cinnamom.,	. . . . .	gtt. v.
Ol. Zingiberis,	. . . . .	gtt. vij.
Alcohol,	. . . . .	℥xiv.

Then color the acid by an infusion of rose leaves made as follows:

R. Rosæ Gallic. Petal.,	. . . . .	℥j.
Aquæ Bullientis,	. . . . .	q. s.

Pour the boiling water on the rose leaves and express  $\text{℥ij}$ .  
Am. Jour. Ph., November, 1874, p. 508.

*Chemically Pure Mineral Acids.*—With the exception of hydrochloric acid, none of the C. P. mineral acids of commerce come up to the standard of specific gravity, although in other respects they are of good *average* quality for such products. P. W. Bedford, in Proceedings, 1874, p. 429.

#### AQUÆ MEDICATÆ.

*Aqua Amygd. Amar.*—In the experience of Oster, the process of the German Pharmacopœia yields bitter-almond water of greater than the prescribed strength, when the process is carefully conducted. He has been in the habit of adding all the spirit directed to the almond paste, and has conducted the distillation in an apparatus properly luted with a mixture of linseed meal, glycerin, and water. The strength of the product was frequently double that of the officinal requirement, and consequently had to be reduced. Ph. Centralhalle, June 4, 1874.

*Aërated Waters.*—The importance of guarding against the introduction of lead into aërated beverages has recently been exemplified in Glasgow, Scotland. An old lady died with symptoms of lead poisoning, and the lead was finally traced to soda-water, which she had very freely consumed. Numerous samples of bottled soda-water, lemonade, gingerade, etc., purchased at different places, were, by Mr. J. C. Hunter, Dr. Wallace, and Dr. Milne, found to contain lead, ranging in quantity from  $\frac{1}{20}$ th to  $\frac{6}{10}$ th of a grain to the gallon. Ph. Jour. Trans., October 3d, 1874, p. 261.

#### CATAPLASMATA.

*A New Poultice* has been invented by Lelièvre, which is recommended in the highest terms by Lefort, in his report to the Académie de Médecine (Paris?). It is prepared by saturating two superimposed layers of wadding with a solution of *Fucus crispus* (Irish moss), and drying them in a stove after they have been submitted to strong pressure. In this way a

sheet of the consistence of cardboard is obtained, a portion of which is cut off, as wanted, and soaked in hot water for fifteen or twenty minutes; this swelling it out and filling its tissue with a mucilaginous fluid. It can be prepared in large quantities beforehand, as when it has once been dried it will keep for a long time without alteration; and, having been tried with great satisfaction of both patient and attendants in several hospitals, seems destined to supersede the time-honored linseed-meal poultices. Ph. Jour. Trans., January 9th, 1875, p. 547; from Med. Times and Gazette.

#### CERATA ET UNGUENTA.

*Mercurial Ointment.*—The following method for the rapid extinguishment of the mercury is proposed by George Bayle: Put into a mortar 100 grams of mercurial ointment from a previous operation, and 500 grams of mercury; with rapid trituration add gradually 30 grams of sulphuric ether, and in a few minutes the mercury will be divided into imperceptible globules; then add about 100 grams of lard, and, after several minutes of vigorous trituration, examine in the usual way whether the extinction of the metal has been effected. If some globules still remain visible, the addition of a little ether and some trituration will complete the process. The ointment is then finished (according to the Codex) by adding the requisite quantity of lard. By using 960 grams of benzoinated lard, with which 40 grams of white wax have been incorporated, the ointment will in every respect correspond with the formula of the new Codex. Am. Jour. Pharm., December, 1874, p. 561; from Jour. de Chim. Méd., 1874.

*Mercurial Ointment.*—Ten samples, purchased by Mr. Jacob A. Muthersbough as officinal mercurial ointment, were found to contain respectively 48.5, 48.5, 48, 46, 30, 30, 26, 25, 24, and 22 grains of mercury in 100 grains. The process pursued by the author, which, when tried on mercurial ointment of known strength, gave accurate results, was as follows: 100 grains of the ointment is boiled with 1 fluid ounce of muri-

atic acid until the fat separates and floats upon the surface; the liquid portion is separated, and the residual powder of mercury is boiled with muriatic acid until it runs into a globule, and then washed with benzin to remove the last traces of fat. It is then dried and weighed. *Am. Jour. Pharm.*, September, 1874, p. 409.

*Ungt. Hydrarg. Oxidi Rubri.*—A. S. v. Mansfelde, M.D., recommends the following formula as a substitute for that of the U. S. Pharmacopœia: *Rj.* Hydrarg. oxidi rubri, 3j; olei theobromæ, ol. amygdal. dulc., āā q. s., ad 3j. The oil of sweet almonds to be increased according to climate and circumstances. *The Pharm.*, March, 1875, p. 69.

*Unguentum Zinci Oxidi.*—A. S. v. Mansfelde, M.D., recommends benzoated oxide of zinc ointment by melting together equal parts of oil of sweet almonds and white wax, adding 3j of tincture of benzoin to the quantity necessary to make 1 ounce of ointment, testing until the alcohol has evaporated, and then adding slowly, and in fine powder, 80 grains of oxide of zinc. Remove from the bath and stir till cold. An elegant preparation is the result. *The Pharm.*, March, 1872, p. 69.

*Cosmoline*, a paraffin ointment, is the subject of a paper read before this Association at its last annual meeting, for which see *Proceedings*, 1874, p. 384.

*Paraffin Ointment.*—J. L. Lemberger and A. W. Miller offer a formula for paraffin ointment as a substitute for “cosmoline.” They use the purified residuum of the Smith’s Ferry petroleum, of 80° B., and add to 16 parts of this oil 1 part of the best white, hard paraffin, previously melted on a water-bath. The rectified petroleum residuum, of the above brand and quality, is purified by passing it through a series of two, three, or more, tall cylindrical percolators, having a height of ten to twenty times their diameter, and which are filled to near the top with granulated animal charcoal, and are kept at a temperature of about 150° F. The deodorized and decolorized portions are reserved, and the next product passing is poured upon the next percolator, etc. In this way an odor-

less and nearly colorless oil is readily obtained. The product should never be heated, either while purifying or during subsequent pharmaceutic application, to above 150° F. The Smith's Ferry wells product seems to be the best suited for this purpose, but there may be others that will answer equally well. The authors suggest the following formula for

*Paraffin Cerate*, as an elegant substitute for simple cerate: Pure beeswax, 1 part; purified paraffin oil, 9 parts. Melt the beeswax on a water-bath, and add the oil. They also suggest the following

*Paraffin Pomade*: Paraffin ointment, 10 ounces; oil of rose, 20 drops; oil of bergamot, 30 drops. Am. Jour. Pharm., June, 1875, p. 257.

*Ointment of Chloral and Veratria* is proposed by Mr. Robert F. Fairthorne, and is prepared as follows: Dissolve 10 grains of veratria in a mixture of 1 drachm of chloral hydrate and 6 drops of water by gentle heat, and incorporate the solution with half an ounce of lard. Am. Jour. Pharm., December, 1874, p. 550.

*Camphor Ice*.—Mr. Thomas J. Covell gives in The Pharmacist, December, 1874, p. 354, thirteen different formulas for preparing this article, the formulas being arranged in tabular form so as to insure a rapid oversight of them.

#### CHARTÆ.

*Charta Sinapis*.—When prepared according to the formula in the "Additions" to the (British) Pharmacopœia, mustard paper presents on the surface of the mustard a glossy, varnished appearance, and, containing too much gutta-percha, retards the absorption of moisture, and, consequently, prevents the development of the essential oil upon which the activity of the paper depends. With the object of remedying these objections, A. W. Gerrard tried a solution of india-rubber in benzole, instead of gutta-percha in chloroform, judging from the physical properties of the india-rubber that much less would be required than of gutta-percha. By adopting the following formula he has succeeded in obtaining a paper

free from the abovementioned objections: Take of caoutchouc, 1 part; benzole, 49 parts; black mustard, in powder, a sufficiency. Dissolve the caoutchouc in the benzole; then stir in the mustard till of a proper consistence for spreading on paper. The author also regards the removal of the fixed oil in the mustard, either by expression or by percolation with benzole, an advantage, thus removing the cause of the greasiness on the back of the paper, and at the same time rendering the mustard more active. Paper spread with the mixture, proposed by the author, has a dull, smooth surface; the mustard adheres well, and readily absorbs moisture and develops essential oil. Ph. Jour. Trans., May 9th, 1874, p. 889.

*Charta Vernicea.*—Varnished or oiled paper has lately been quite extensively used in place of the more expensive oiled silk. According to Ernst Thorey, such a paper is best prepared as follows: 100 parts of linseed oil is boiled with  $\frac{1}{2}$  part of carbonate or borate of manganese in fine powder for about half an hour over an open fire, and with continuent stirring, at a temperature of  $200^{\circ}$  C. ( $= 392^{\circ}$  F.), the varnish so produced being filtered through a double filter. Or, 100 parts of linseed oil is boiled with 2 parts of boric acid, dissolved in 24 parts of water, until all the water is evaporated; the varnish so produced is then filtered. The varnish, as prepared by either method, is then spread upon paper, which is placed on warmed plates, by means of a sponge, or, better, with a soft hair-pencil. It is then hung up to dry at ordinary temperatures, and may be regarded as dry when it no longer adheres to the fingers. The drying will require about four days, but it then has lost its adhesive qualities completely. Ph. Centralhalle, August 6th, 1874, p. 262.

*Water-proof Paper* is produced readily by the aid of a solution of cellulose in ammoniacal solution of copper, according to Prof. Böttger. The one side of a sheet of unsized paper is coated by means of a broad brush with the cellulose solution; another sheet is laid on the coated surface, and the whole is then subjected to powerful pressure between rollers, or otherwise, and dried. Paper so prepared is perfectly homogeneous,



impervious to water, and cannot be separated even by boiling it in water. By passing the dry paper (from Swedish filtering) through a cold mixture of two volumes of fuming sulphuric acid and one volume of water, and washing the paper so treated, a membrane-like, very tough substance is obtained, which may find very useful application. N. Rep. Ph., No. 11-12, 1874, p. 733.

#### COLLODIUM.

*Collodium Antiphelidicum.*—Hager gives the following formula, useful against tan, freckles, etc.: Agitate 1.0 finely powdered sulpho-carbolate of zinc with 45.0 collodium, 5.0 alcohol, and 1.0 oil of lemon; allow to subside, and decant the clear liquid. Ph. Centralhal., No. 53, 1874, p. 435.

#### CONFECTIONES.

*Confections of the British Pharmacopœia.*—T. Haffenden read a critical paper upon the confections of the British Pharmacopœia at the meeting of the British Pharmaceutical Conference (1874). The author's remarks, applying to the preparations of a foreign standard, need not be extracted for this report, but he makes a suggestion in connection with confection of scammony which deserves the attention of the revisers of our standard. He suggests the advisability of preparing a *simple confection*, composed of the pulps of tamarinds or prunes, with sugar, glycerin, etc., which would serve as a basis for the extemporaneous preparation of confections from various medicinal substances. Proc. Br. Ph. Conf., 1874, p. 615.

*Electuarium e Senna.*—The confection of the German Pharmacopœia has a great tendency to sour, and various methods have been proposed to overcome this. Hager, in his *Commentary*, suggests to substitute a mixture of twenty parts of glycerin and thirty parts of syrup for syrup alone; but this is found by Schulze not to prevent fermentation entirely. If, however, the syrup is entirely substituted by glycerin, a perfectly stable preparation is obtained, and such a preparation may be made without the aid of heat. Arch. Pharm., February, 1875, p. 148.

*Medicated Pastes.*—F. Vigier recommends to add to marsh-mallow paste, and similar preparations, some glycerin, to prevent them from getting dry and hard: 1 part of glycerin to 40 parts of gum will be found sufficient for the purpose. A. J. Ph., June, 1875, p. 265.

#### ELIXIRIA.

*Elixir of Boldo* (*Peumus boldus*, Molina), is prepared by Verne by treating 200 grams of boldo leaves by displacement with 1500 grams of 60° alcohol. The entire quantity of alcohol is recovered by the addition of a small quantity of water, the amount of which is noted. Afterwards the quantity of water is increased to 600 grams, with which a weak decoction is prepared from the exhausted leaves. With the decoction and 600 grams of sugar a syrup is made, which is mixed with the alcoholic tincture. After twenty-four hours the product is filtered. Ph. Jour. Trans, November 21st, 1874, p. 406.

*Elixirs of Cinchona.*—Hans M. Wilder proposes the following improvement in the elixirs of cinchona adopted by the American Pharmaceutical Association:

*Elixir of Cinchona.*—Dissolve 16 grains of sulphate of cinchona and 8 grains sulphate of quinia in 1 pint of simple elixir (Am. Ph. Assoc.) and color with 30m each of caramel and of tincture of cudbear (1-8). Filter after it stands a week.

*Ferrated Elixir of Cinchona.*—Dissolve 128 grains of pyrophosphate of iron in 1 ounce of water, and make up to a pint with elixir of cinchona.

*Compound Elixir of Cinchona.*—To 3 drachms of tincture of serpentaria add sufficient elixir of cinchona to make one pint.

*Ferrated Compound Elixir of Cinchona.*—Dissolve 128 grains of pyrophosphate of iron in 1 ounce of water, and make up to a pint with compound elixir of cinchona.

*Red Elixir.*—Color 1 pint of simple elixir with about 1 to 2 drachms of tincture of cudbear. A. J. Ph., February, 1875, p. 59.

*Elixir of Phosphorus.*—Mr. G. J. Luhn suggests the following formula for an elixir of phosphorus, which he states is

satisfactorily prescribed by some physicians of Charleston, S. C.: Take of phosphorus, 1 grain; conc. sulphuric ether, fʒijss.; alcohol, fʒj; tr. menth. pip. (spiritus?), fʒss.; Bower's glycerin, q. s., to make fʒiiij. The phosphorus being dissolved in the ether, the alcohol is added, then the essence of peppermint, and this is followed by the careful addition of the glycerin, which should be in small proportion and carefully shaken after each addition until the mixture becomes clear again. If the addition of glycerin is too rapid a portion of the phosphorus will be precipitated.

The taste of the preparation is quite burning, but it is readily taken with a little syrup. The addition of the latter produces milkiness, which the author thinks does not interfere with the administration of the elixir. A. J. Ph., July, 1874, p. 308.

*Elixir of Tar* is proposed by Magnes-Lahens as follows: 5 grams of tar (of *Pinus maritima*) is triturated with 15 grams of sugar, and then with 100 grams of alcohol of 67 per cent., which is to be added gradually. When the sugar is dissolved the liquid is filtered, and contains 3 grams of the hydroalcoholic extract of tar, or 0.15 grams in the coffeespoonful. The latter quantity is sufficient for a glass of water, and yields a good tar-water, containing but a small quantity of alcohol. A. J. Ph., September, 1874, p. 416; from J. de Ph. et de Chim., August, 1874.

*Elixir of Wild Cherry*.—A writer in the American Druggists' Circular (July, 1874, p. 123) communicates the following formula for an elixir of wild cherry, which he states is a pleasant aromatic tonic, designed specially as a vehicle for the administration of sulphate of quinia, "the taste of which it conceals completely:" One pint infusion is made with 4 ounces of wild cherry bark, by cold percolation. Six pints of infusion is made by cold percolation of 8 ounces of decorticated and finely ground liquorice root. The two infusions are mixed and filtered. 1 ounce each of red saunders, Ceylon cinnamon, star anise, and coriander, and  $\frac{1}{2}$  ounce each of caraway and cardamom seed are percolated with sufficient alcohol to make 1 pint of tincture. This is mixed with the filtered infusion and 16 ounces of sugar, and after twenty-four hours the mix-

ture is filtered. One fluid ounce is sufficient to cover the taste of 12 grains of sulphate of quinia. *No acid should be used with it.* Am. Drug. Circ., July, 1874, p. 123.

#### EMPLASTRA.

*Plasters of the British Pharmacopœia.*—A. W. Gerrard has communicated to the British Pharmaceutical Conference (1874) a paper embracing criticisms upon the official plasters of the British Pharmacopœia; excepting only cantharides plasters, which is to be the subject of a separate paper. The author was induced to undertake his experiments from a knowledge of the unsatisfactory character of most of the forms given for their preparation, and expresses the hope that at some future day the compilers of the British Pharmacopœia may deem it necessary to give these preparations their attention. Without attempting to give the author's reasons for the changes made, which seem to be justified upon correct observation, the following modifications of the official formulas are given in brief:

*Emplastrum Ammoniaci cum Hydrargyri, B. P.*—R. Ammoniacum, in tears, 10 oz.; water, 8 oz.; yellow wax, 2 oz.; mercury, 3 oz.; olive oil, 4 drms; sulphur, 16 grs. Heat the oil and sulphur together, stirring until they unite; with this mixture triturate the mercury; dissolve and strain the mercury with the water; evaporate the latter properly; incorporate the yellow wax; and, finally, the prepared mercury.

*Emplastrum Belladonnæ, B. P.*—Belladonna leaves are exhausted with rectified spirit, and the tincture is evaporated to the consistence of an extract, one part of which is incorporated with eleven (11) parts of lead plaster.

*Emplastrum Calefaciens, B. P.*—The author recommends the substitution of resin plaster for the soap plaster at present used.

*Emplastrum Cerati Saponis, B. P.*—Instead of using a gallon of vinegar use eighteen ounces of acetic acid, being the correct quantity to dissolve the oxide of lead.

*Emplastrum Ferri, B. P.*—The omission of Burgundy pitch improves the plaster.

*Emplastrum Galbani, B. P.*—The official formula is satisfactory.

*Emplastrum Hydrargyri, B. P.*—The proportions of olive oil and sulphur might be doubled with advantage.

*Emplastrum Opii, B. P.*—1 oz. extract of opium ;  $\frac{1}{2}$  oz. each of glycerin and water ; 18 oz. resin plaster.

*Emplastrum Picis, B. P.*—The water in the present form serves no purpose and might be omitted.

*Emplastrum Plumbi, B. P.*—10 pints good, fresh Italian oil ; 6 pounds oxide of lead in fine powder ; 4 pints of water, or q. s. Boil together until united. The present formula does not require sufficient litharge, and consequently the plaster is too sticky.

*Emplastrum Plumbi Iodidi, B. P.*—Omit the soap and prepare as follows : Melt together  $1\frac{1}{2}$  oz. resin and 1 pound of lead plaster, and stir in 2 oz. of iodide of lead, in fine powder.

*Emplastrum Resinæ, B. P.*—For use in winter the official formula will answer ; in spring use one-half, and in summer and autumn one-fourth the quantities of soap and resin.

*Emplastrum Saponis, B. P.*—The author, not being acquainted with its special uses and advantages, can suggest no important change in the official formula. Proc. Br. Ph. Conf., 1874, pp. 514 to 525.

*Lead Plaster.*—Charles Umney has made experiments with the lead plaster of the British Pharmacopœia, and confirms the observation of Gerrard, that it does not contain sufficient lead, and that its sticky qualities are due to uncombined oil. The British Pharmacopœia directs but 43.6 parts of litharge to 100 parts of oil, whereas all the other pharmacopœias use proportions varying between 50 and 56 parts to 100 parts of oil or fat. He finds that 1 part of litharge to 2 of olive oil will form a good plaster. Ph. Jour. Trans, March 6th, 1875, p. 701.

Professor Redwood, commenting on the above paper at the meeting of the Pharmaceutical Society of Great Britain, after its reading, suggests that only the best Italian oil should be used, as is intended by the officinal formula, and that had such oil been used by the author his conclusions might, per-

haps, have been in favor of the Pharmacopœia formula. He also drew attention to the necessity of long-continued boiling, even after apparent combination has been effected between the oily acids and litharge.

*Emplastrum Cerussæ*.—Jungclaussen proposes oleic acid in place of olive oil to make this plaster, and omits the litharge altogether, using therefor a corresponding quantity of finely powdered carbonate of lead. The proportions are, 40 parts oleic acid and 49 parts carbonate of lead. The oleic acid is heated in a well-tinned copper vessel, and the carbonate of lead is then added gradually, with assiduous stirring; the stirring being continued as long as carbonic acid is eliminated. The process requires but half an hour for completion. Ph. Centralhalle, No. 3, 1874, p. 18.

*Emplastrum Saponatum* is recommended by Jungclaussen to be prepared from *emplastrum cerussæ* (see above), by melting together 120.0 parts of the cerussa plaster with 20.0 parts of yellow wax, allowing the mixture to cool to semi-liquid consistence, and then incorporating 10.0 parts of powdered castile soap and 1.66 parts of camphor, dissolved in just sufficient olive oil. Ph. Centralhalle, No. 3, 1874, p. 18.

#### ESCHAROTICA.

*Caustic Pencils*.—W. Steffen prepares such from sulphate of copper, by gently heating the coarsely powdered crystals in an evaporating-dish until the mass, which melts at first, acquires a tough consistence. The mass is then plastic, and may readily be rolled out, as are pill masses, to cylinders of suitable size. With a little experience, pencils of 1 millimetre thickness may readily be obtained, and equal to those cut from a crystal. In a like manner the author has prepared alum pencils, or such of a mixture of alum and sulphate of copper. Arch. Pharm., December, 1874, p. 519.

*Arsenical Caustic* (Ratier's).—The following formula is given by A. E. Ebert: Take 1 part of arsenious acid, 8 parts of kino, and 16 parts of cinnabar, each in very fine powder, and mix. Collated Practical Receipts in The Pharm., April, 1875.

*Black Caustic* (Velpéau's).—Triturate in a porcelain mortar 30 grains of powdered liquorice root, and add sulphuric acid in small quantities until a suitable mass is formed. Ibid.

*Cantharides Caustic*.—Take 1 part of tannin, and 2 parts of cantharides, each in fine powder, and form with sufficient acetic acid a suitable paste. Ibid.

*Zinc Caustic*.—Take 1 part of chloride of zinc, and 2 parts of flour, and form into a stiff paste with water. Ibid.

*Fuligokali* (Paris Hospitals).—The following formula is given by A. E. Ebert: Take 1 part of caustic potassa, dissolve it in a sufficiency of water, add 5 parts of wood soot, boil one hour, dilute with water, filter, evaporate to dryness, and place in well-corked bottles. Dose, 2 to 3 grains. Collected Practical Receipts in The Pharm., April, 1875.

*Iodine Caustic* is prepared by dissolving 4 grams of iodine in 8 grams of glycerin, and is useful in lupus, by applying it every other day, and covering the parts with gutta-percha. Am. Drug. Circ., September, 1874, p. 157.

#### EXTRACTA.

*Yield of Solid Extracts*.—Dr. Danckwortt reviews the replies received to a prize question, "On the Yield of Solid Extracts" (according to Ph. Germ.?), and regards the following yields as correct and final averages:

Extract. Aurantii Corticis,	.	.	.	.	.	80 per cent.
" Belladonnæ,	.	.	.	.	.	8.5 "
" Centaurei,	.	.	.	.	.	24 "
" Chamomillæ,	.	.	.	.	.	25 "
" Chin. fusc. frig. par.,	.	.	.	.	.	12 "
" Colombo,	.	.	.	.	.	10.5 "
" Conii,	.	.	.	.	.	8 "
" Digitalis,	.	.	.	.	.	4 "
" Graminis,	.	.	.	.	.	26 "
" Hyocyami,	.	.	.	.	.	8 "
" Lign. Campechian.,	.	.	.	.	.	11.5 "
" Liquiritiæ,	.	.	.	.	.	30 "
" Millefolii,	.	.	.	.	.	25 "
" Myrrhæ,	.	.	.	.	.	50 "
" Pulsatillæ,	.	.	.	.	.	4.5 "

Extract. Quassiae, . . . . .	5 per cent.
" Sabinæ, . . . . .	28 "
" Secale Corn., . . . .	16 "
" Senegæ, . . . . .	24 "
" Stramonii, . . . . .	8 "
" Valerianæ, . . . . .	24 "

In the following the variation is so considerable, that the question must still be regarded undecided:

Extract. Absinthii, . . . . .	15	-81.25 per cent.
" Calami, . . . . .	16	-81.44 "
" Cannabis Ind., . . . . .	11.86-20.88	"
" Chelidonii, . . . . .	1.95- 8.16	"
" Chinæ fusc., . . . . .	14	-81.64 "
" Cinæ, . . . . .	19	-46.5 "
" Cubebæ, . . . . .	14.6	-26.5 "
" Fab. Calabar., . . . . .	8.75-86	"
" Helenii, . . . . .	17	-82.6 "
" Rhei, . . . . .	82.75-62.5	"
" Scillæ, . . . . .	20	-77 "
" Taraxaci, . . . . .	5(?)	-89.5 "

In view of these differences, a prize has been again offered for the best essay on the subject. Arch. Pharm., February, 1875, p. 128.

*Narcotic Extracts.*—The following question, issued by the Executive Committee of the British Pharmaceutical Conference, has been replied to by W. E. Heathfield: "In preparing extracts of aconite, belladonna, hemlock, henbane, and colchicum, should the starch and chlorophyll of the plants be rejected or retained?" Mr. Heathfield replies that in the case of colchicum the starch separates at once from the cold expressed liquor, and can be washed so as to leave it tasteless. There seems, therefore, no objection to its removal. In the narcotic extracts of aconite, belladonna, hemlock, and henbane, however, the starch is in assimilation, and cannot be removed in this way. The removal of the chlorophyll in them necessitates the coagulation of albumen, and, consequently, a higher temperature than seems advisable. Moreover, both the chlorophyll and albumen are apt to carry down with them a portion of the active alkaloid, and the author, therefore, does not favor their removal until a more accurate discernment of



these uses and value is possible. Proc. Br. Ph. Conf., 1874, p. 602.

*Ergotin* (Bonjean's).—Mr. James R. Mercein draws attention to the inferior character of this preparation, as found in our markets with "Merk's" label. This preparation, being simply an alcoholic extract of an aqueous extract of ergot, should be nearly or completely soluble in alcohol. Three samples of Merk's preparation were treated with strong alcohol, and left respectively 45, 46, and 60 per cent. of residue insoluble in that menstruum, but soluble in water. From one pound of ergot the author obtained, by the process given in the U. S. Dispensatory, 10 drachms of Bonjean's ergotin, which dissolved, with slight residue, in 4 to 5 times its weight of alcohol. He found it necessary, in order to exhaust the gummy aqueous extract of ergot with alcohol, to thoroughly triturate it in a large mortar, with successive portions of alcohol. The experience of the author points to the importance of pharmacists preparing all the preparations within the scope of a pharmaceutic laboratory, rather than to depend upon the manufactures of other houses, however renowned such may be for the quality of their products. The Pharmacist, September, 1874, p. 257.

*Extractum Chinæ Frigide Paratum*.—This preparation is still adhered to by German practitioners of medicine, and, notwithstanding the unfavorable criticisms of numerous writers, has been incorporated into the German Pharmacopœia. Mr. Hugo F. Bauer suggests the following formula for its preparation, which he states will produce an extract superior to that usually found in the markets, while at the same time it conforms essentially with the German Pharmacopœia: Take of pale quill bark any desirable quantity, reduce it to fine powder, so that it passes through a sieve of fifty to sixty meshes, moisten the powder with distilled water (or water free from lime salts), pack it into a percolator, and percolate until 1 gallon of menstruum has been used for each pound of bark. Evaporate the percolate to one-fourth its volume, strain through muslin, and add to the strained liquid,

for every 10 fluid ounces, 1 fluid drachm of glycerin. Continue the evaporation, with constant stirring, until an extract is obtained having a sp. gr. of 1.250. The yield is about 25 per cent (!). *The Pharmacist*, September, 1874, p. 259.

E. C. Kauffmann suggests that the glycerin be added to the infusion, previous to evaporation to one-fourth, as suggested by Bauer. The deposition of apotheme is thus prevented. The source of heat should under no circumstances be other than that of a water-bath. *The Pharm.*, February, 1875, p. 33.

*Extractum Chinæ Fuscae*.—C. Schneider has made the observation that ext. chinæ fuscae, when kept in the ordinary porcelain jars, soon becomes perfectly dry, and may then readily be powdered. He therefore suggests the propriety of so modifying the officinal directions of the German Pharmacopœia, that it shall be evaporated to dryness; else that it be directed to be kept in well-stoppered vessels. *Arch. Pharm.*, 1875, p. 60.

*Succus Liquir. Dep.*.—E. Ungewitter purifies the common extract of liquorice by placing the sticks in layers, separated by wooden trays made of thin sticks, into a suitable water-tight wooden vessel (the author uses one that is square), and macerating in rain-water for three to four days, when the liquor may be drawn off from the perfectly exhausted sticks of liquorice, and immediately concentrated to such a consistence that 1 part of extract will be represented by  $1\frac{1}{2}$  part solution. The preparation is then filled into glass vessels of proper size, corked air-tight, and boiled for about an hour in water. So prepared, the purified extract will keep unchanged for years. The author also draws attention to the advantages of first exhausting the liquorice sticks with 90 per cent. alcohol, by which the resinous constituent, possessing a disagreeable and acrid taste, is completely removed. The alcohol may, of course, be again recovered, while the subsequently prepared purified extract possesses a pleasant and purely sweet taste. *Arch. Ph.*, February, 1875, p. 134.

*Succ. Liquirit. Dep.*.—According to Shorting its preparation succeeds well by the following method: A stone jar, of the

requisite capacity, is provided with a glass siphon, reaching to the bottom of the jar. A dense layer of clean straw is then placed on the bottom, and on the top of this the extract of liquorice, which is then covered with water. After several days' standing the infusion is drawn off by the siphon, and the process of maceration repeated, if necessary, with a fresh portion of water. The infusion, so obtained, is perfectly clear, and affords, on evaporation, a very satisfactory preparation. During the hot months of summer mould is apt to form on the liquid while macerating, but this is completely retained by the straw. Arch. Ph., October, 1874, p. 331.

*American Liquorice.*—It is a gratifying fact, observed by A. W. Miller, that extract of liquorice of American manufacture, not only is equal to but excels some of the best European; the more so, since the charge has been implied that American liquorice was adulterated. See Proceedings, 1874, p. 394.

*Extractum Ligni Campechiani.*—The criticism of Professor Flückiger on this officinal of the German Pharmacopœia, to the effect, "that the commercial article is of such superior quality, as prepared on a large scale, that it is questionable whether its preparation in the pharmaceutical laboratory is a judicious requisite," has induced C. Schneider to submit some facts in controversy of Prof. Flückiger's view. The author regrets that so imperfect a formula as that of the German Pharmacopœia should have been adopted; but states that, nevertheless, the product obtained is far superior to the commercial article, which, as a rule, leaves from 37 to 40 per cent. of *resin-like* residue when treated with water, while the residue, remaining from the officinal extract under the same treatment with water, is apparently very differently constituted, and may by continued trituration with small quantities of water be entirely redissolved. The author considers that the direction to boil the logwood in water is a radical error, and recommends the method of Schacht, to infuse twice successively in hot water, as preferable to that of the German Pharmacopœia. If in addition to this the infusion is evaporated in a partial vacuum at a temperature of 35° to 40°

C. (= 95° to 104° F.), an unexceptionable preparation may be obtained. Arch. Ph., June, 1874, p. 519.

NOTE.—The process of the German Pharmacopœia is essentially the same as that of the United States Pharmacopœia, and the above remarks by Schneider therefore apply with equal force to the extractum hæmatoxyli of our Pharmacopœia.—C. L. D.

*Extract of Rhatany.*—Wittstein discovered, in 1854, in South American extract of rhatany a crystallizable compound, which he stated to be identical with *tyrosin*; E. Runge (1862) obtained the same compound, and named it *rhatanin*, and, in 1869, Gintl also obtained it from Brazilian extract of rhatany. Kreitmair has since (1874) endeavored to obtain it from various commercial samples of extract of rhatany, and, while he obtained it from an old sample, he utterly failed to obtain it from any recent samples of German commerce, among which was one at least of Peruvian origin. He, therefore, considers it possible, that extract of rhatany from Peru is adulterated there. Extracts of rhatany produce dark-red precipitates with subacetate of lead, except those from Peru, which produce pale, purplish-red precipitates. A. J. Ph., June, 1875, p. 267; An. Ch. Ph., 1875.

*Extract of Guarana.*—The following formula is proposed by Mr. J. B. Moore: From 16 troy ounces obtain 1 pint of tincture with a menstruum of 3 measures of alcohol fort. and 1 measure of water; set the tincture aside to evaporate spontaneously, and continue the percolation until the drug is exhausted. Evaporate the second percolate, at a temperature not exceeding 140°, to a syrupy consistence, and, together with fʒss. of glycerin, add to the reserved portion and evaporate the mixture at a temperature not exceeding 120°, to a proper consistence. During the concentration, and especially towards the close, almost constant stirring is required. A. J. Ph., November, 1874, p. 500.

*Extract of Nux Vomica.*—It is a well-known fact that when extract of nux vomica is prepared according to the United States Pharmacopœia, a considerable quantity of fixed oil

separates when the extract has been properly concentrated. The manufacturer usually removes this, and this is absolutely necessary to the preparation of the powdered extract of *nux vomica* which has been introduced lately. To ascertain whether this oil contained any notable portion of the alkaloids of *nux vomica*, Mr. Charles Bullock has made some experiments. From 150 lbs. of *nux vomica* 5 pints of oil were obtained; 4 fluid ounces of this oil yielded to dilute sulphuric acid 10.6 grains of alkaloids, which proved to be composed mainly of *brucia*, and contained a little *strychnia*. The author, therefore, suggests the propriety of agitating the oil with a little diluted alcohol, as already recommended by Prof. Procter, to separate from it any adhering extractive matter. *A. J. Ph.*, September, 1874, p. 405.

*Alcoholic Extract of Boldo* (*Peumus boldus*, Molina).—Verne recommends the following method for its preparation: 100 grams of leaves, coarsely powdered, are exhausted in a displacement apparatus by 400 c.c. of 60° alcohol. Upon evaporation of the tincture, which has a warm taste and a reddish-black color, 20 grams of dry extract is obtained, which is dark red, with a greenish tinge, and has a hot, sweetish-bitter taste.

*Aqueous Extract of Boldo* is prepared by macerating 100 grams of the contused leaves in distilled water for twenty-four hours on a water-bath, so as to leave 1000 grams at the end of the operation. The infusion so obtained has a reddish color, a slightly sweetish-bitter taste, and yields 15 grams of (dry) extract. *Ph. Jour. Trans.*, Nov. 21st, 1874, p. 406.

*Ext. Cocæ Aquosum*.—Mr. Shuttleworth proposes the following formula: Coca in moderately coarse (No. 40) powder; water, a sufficiency. Macerate the coca with four times its weight of water for twelve hours, at a temperature not exceeding 120° F. Transfer to a percolator and exhaust with water. Evaporate by means of a water-bath to the consistence of an extract; 100 parts yield 36 parts of extract, which is of a dark-brown color, and has a bitter but not very characteristic taste.

*Ext. Cocæ Alcoholicum* is prepared by exhausting coca in moderately fine powder (No. 50), with alcohol of sp. gr. .838, by percolation, and evaporating to the proper consistence, at a temperature not exceeding 150° F. The resulting preparation is superior to the watery extract, possessing in the highest degree the characteristic taste and odor of the plant, and seems to possess also its full medicinal properties. It is of a green color, resembling extract of Indian hemp; is apparently resinous in its character, attributable to coca-wax or other concrete oily substance, and is hygroscopic, becoming, in time, quite liquefied; 100 parts of the leaves yield 15 parts of extract. The dose of the watery extract may be 15 to 30 grains, of the alcoholic preparation 10 to 20 grains. Ph. Jour. Trans., December 19th, 1874, p. 484.

*Ext. Quassia.*—J. S. Whall finds that an extract of quassia, prepared by percolation of the wood with dilute alcohol, keeps better, is of better consistence, and seems to represent the activity of the drug more nearly than does the officinal extract made with water. See Proceedings, 1874, p. 379.

#### EXTRACTA FLUIDA. .

*Fluid Extracts.*—Charles B. Allaire draws attention to a fault in the construction of the officinal formulas for fluid extracts. The direction (in the general formula) that 14 fluid ounces of percolate (from 16 troy ounces of drug) shall be reserved, and the next following (10 fluid ounces) shall be evaporated to 2 fluid ounces, and added to the reserve, causes, when the menstruum is hydro-alcoholic, very generally a precipitate. The framers of the *Pharmacopœia* have lost sight of or disregarded the fact that when a hydro-alcoholic tincture is evaporated, the alcohol is all dissipated, and the remaining portion contains the extracted matter in admixture (or solution) with water only. To overcome the difficulty the author reserves only 13 fluid ounces, and distils the next percolate to 1½ fluid ounces, reserving also the first 1½ fluid ounces of alcoholic distillate. The three portions so obtained are mixed, and a fluid extract is thus formed, which is not only less liable to form a precipitate, but contains also volatile

ingredients from the reserved portion, which in the officinal process are lost. The Pharm., February, 1875, p. 35.

*Fluid Extract of Azedarach.*—Mr. John Joseph Miles suggests the following process for the preparation of a fluid extract of the bark of *Melia azedarach*: Take of the inner bark of the root, 16 troy ounces; dilute alcohol, a sufficient quantity. Macerate the bark (powdered?) in 16 fluid ounces of the dilute alcohol for twenty-four hours, then percolate until 12 fluid ounces have been obtained, and set this aside. Continue the percolation with sufficient dilute alcohol to obtain 12 fluid ounces of percolate; evaporate this to 2 fluid ounces, and add to the reserved portion. Filter, add 6 troy ounces of white sugar, and dissolve by aid of a gentle heat. The author states that the fluid extract so prepared has been used with satisfaction and decided results in the dose of  $\frac{1}{2}$  to 1 teaspoonful, according to age. The therapeutic properties of the bark are anthelmintic, in large doses narcotic. Accepting dilute alcohol as the proper menstruum, the directions for preparing the fluid extract might, perhaps, more properly be accommodated to the general direction for fluid extracts in our Pharmacopœia. A. J. Ph., August, 1874, p. 359.

*Ext. Cocæ Fluidum.*—Based upon his studies of the chemical constituents of coca, Mr. E. B. Shuttleworth suggests the preparation of a fluid extract of coca leaves by exhausting them with alcohol of sp. gr. .835 to .888, in a manner similar to the general process of the U. S. Pharmacopœia for fluid extracts. Ph. Jour. Trans., December 19th, 1874, p. 484.

*Liquid Extract of Ergot* (Ph. Br.).—A. W. Gerrard has made some critical experiments upon the liquid extract of ergot of the Br. Ph., and concludes that this preparation maintains a superiority over the continental and transatlantic formulas. The formula is, however, susceptible of improvement, and the author suggests that the extraction of the fixed oil by ether is superfluous, that maceration in cold water is preferable to water at 160° Fahr., and that a smaller quantity of alcohol should be used for its preservation, by which the crystallization of large quantities of acid phosphates is pre-



vented. One pound of ergot is macerated in 4 pints of water for twenty-four hours, transferred to a strainer, and when the liquid has drained, 2 pints more of water are allowed to run through the residue, which is then expressed strongly, and the united liquids evaporated to 10 ounces; 8 ounces of spirit is added, the clear liquid decanted from coagulated albumen, and filtered through tow. The quantity of spirit of the B. P. is retained in this, but, as before stated, had better be reduced so as to constitute 25 per cent. in the finished preparation. Ph. J. Trans., April 3d, 1875, p. 805.

Mr. Linford, commenting on the above paper, remarks that one-fourth alcohol is scarcely sufficient to prevent the liquid extract made with cold water from becoming acid. If the alcohol is added to the properly concentrated liquid while it is still warm, the albumen is separated more easily, and the extract will readily filter through paper while hot. When cold, it is almost impossible to filter through paper. Ibid., 819.

*Comp. Fluid Extract of Dewberry Root.*—Dr. Polk recommends such a preparation, made by extracting with alcohol, in the usual manner, 8 ounces of dewberry root, 2 ounces each of rhubarb and leptandra root, 3 drachms each of cinnamon and cloves, and 2 drachms of aniseed, making the final product measure 1 pint. Am. Dr. Circ., August, 1874, p. 137.

*Extractum Glycyrrhizæ Fluidum* (B. P.).—Mr. Charles Umney draws attention to the insufficient quantity (11 per cent.) of rectified spirit ordered to be present in the completed product according to the formulas in the Addendum to the B. P. Fermentation had set in during several months' standing, a considerable amount of precipitate, chiefly glycyrrhizin, had been produced, and the preparation had acquired acidity. Ph. Jour. Trans., December 5th, 1874, p. 442.

*Fluid Extract of Guarana.*—The following formula is proposed by Mr. J. B. Moore, who states that the resulting preparation represents the full activity of the drug: Take of guarana, in powder, ℥xvj; alcohol fort., aqua, āā q. s. Mix 8 measures of stronger alcohol with 1 of water, moisten the



powder with the menstruum, and pack it in a glass funnel prepared for percolation, and gradually pour the menstruum upon it until one pint of tincture is obtained. Set this aside in a shallow vessel to evaporate spontaneously to 12 fluid ounces; continue the percolation with the same menstruum until 2 pints more of tincture are obtained, or until the powder is exhausted. Evaporate this by means of a water-bath, at a temperature not exceeding  $140^{\circ}$ , to 4 fluid ounces, mix with the reserved tincture, and filter through paper. A transparent, reddish-brown, bitter, astringent preparation is formed, in which the menstruum is calculated to keep the active matter in perfect solution. A sample, made by the author three months before the date of his paper, showed no signs of deposit. A. J. Ph., November, 1874, p. 497.

*Liquid Extract of Lupulin.*—Such a preparation is proposed by Sarrazin, and is prepared as follows: 30 parts lupulin are macerated in 100 parts alcohol for two days, filtered, the residue washed with a little more alcohol, and then infused in 200 parts water, strained, and evaporated on a steam-bath; the alcoholic extraction being in the meantime evaporated at a temperature of between  $20^{\circ}$  and  $25^{\circ}$  C. ( $= 68^{\circ}$  and  $77^{\circ}$  F.). The properly concentrated liquids are mixed and brought to the measure of 45 parts. The preparation, which is effective, requires shaking before dispensing it. Arch. Ph., October, 1875, p. 334.

*Fluid Extract of the Bark of Rhamnus Frangula.*—Mr. Charles Umney proposes a fluid extract as the most acceptable preparation of buckthorn bark, and recommends the following method of preparing it: Boil 1 pound of the bruised bark in three or four successive portions of distilled water until exhausted. Evaporate the decoctions by the aid of a water-bath to 12 fluid ounces, add 4 fluid ounces of alcohol, and filter. Percolation of the finely powdered bark by dilute alcohol, with a *modus operandi* similar to that of the United States Pharmacopœia for fluid extracts, produces a preparation elegant in appearance, but open to one objection, viz., the precipitation of much resinous matter upon dilution with

water. Made according to the author's method, it mixes with water in all proportions. Ph. Jour. Trans., July 11th, 1874, p. 22.

*Liquid Extract of Sarsaparilla* (B. P.) is simply a concentrated infusion preserved by the addition of a little alcohol. H. Barton advises that the coarsely powdered root be first macerated in equal quantity of proof spirit for ten days, and expressed; then infused for sixteen hours in water, the infusion expressed and evaporated, so that it may make, with the expressed tincture, a quantity equal to a fluid ounce for each ounce of root used. Proc. Br. Ph. Conf., 1874, p. 586.

*Fluid Extract of Stillingia* is prepared by Dr. Polk by percolating, in a similar manner to the general directions of the U. S. Ph., 16 troy ounces of the powdered root with a menstruum of 12 fluid ounces of alcohol and 4 fluid ounces of glycerin, and following this by alcohol until the root is exhausted. The product is finally flavored with 1 drachm of oil of anise and  $\frac{1}{2}$  drachm of oil of orange.

*Comp. Fluid Extract of Stillingia* is prepared by a like method from 6 ounces stillingia, 3 ounces each of iris versicolor and chimaphila umbel., and 2 ounces each of phytolacca decand. and menispermum Canad., alcohol (60°) being the menstruum, and 1 pint the final product.

*Fluid Extract of Phytolacca* is prepared precisely in the same manner as fluid extract of stillingia. Am. Dr. Circ., July, 1874, p. 122.

#### GLYCERITA.

*Glycerite of Litmus*.—J. Martenson finds that the pure coloring matter of litmus will keep unchanged for an indefinite period in solution with glycerin. He, therefore, recommends the preparation of such a solution as follows: Litmus is extracted with hot water, the clear solution evaporated to a small volume, mixed with an excess of 80 per cent. alcohol, and allowed to stand about twenty hours. The clear liquid, containing a dirty blue coloring matter, which is not sensitive to acids, is decanted from the flocculent precipitate, which

is drained, and dissolved in water, forming a nearly black-blue solution. To remove carbonates, sulphuric acid is added until the solution is of a wine-red color, and it is then boiled for a few minutes to expel the carbonic acid. The blue color is then restored by lime-water, the solution allowed to stand twenty-four hours, filtered, evaporated to a syrupy consistence, allowed to stand over night, filtered from sulphate of potassium crystals through cotton, mixed with glycerin, and evaporated as far as possible with steam heat. Ch. Centralbl., No. 26, 1874, p. 406; from Ph. Zeitschr. f. Russ.

*Glycerite of Oxide of Iron* may be prepared, according to E. Hoffmann, by substituting glycerin for the sugar in the modified formula for ferrum oxidatum saccharatum solubile, proposed by the author (see Pulveres in this report). Such a preparation contains 10 per cent. of iron, is of the consistence of thin extract, of a handsome brown-red color, and of the consistence of glycerin, when mixed with it so as to contain 3 per cent. iron. Arch. Ph., August, 1874, p. 138.

*Chloral Glycerite of Morphia* is proposed and prepared by Mr. Robert F. Fairthorne as follows: Dissolve by the aid of gentle heat and with agitation, 5 grains of powdered morphia in a mixture of 1 drachm of chloral hydrate and half a fluid ounce of glycerin.

*Chloral Glycerite of Morphia and Camphor* contains, in addition, 1 drachm of camphor.

*Chloral Glycerite of Veratria* is prepared in the same manner as that of morphia, substituting veratria for the morphia. A. J. Ph., December, 1874, p. 550.

*Glycerolatum Rosatum Leniens* is recommended by Hager as an application to chapped hands, etc., and is prepared by mixing 5.0 grams of finely powdered tragacanth with 225.0 grams of pure glycerin, heating the mixture on a water-bath for one hour, stirring it until cool, adding 5.0 grams of borax dissolved in 25.0 grams of rose-water, and 1 drop of oil of rose, dissolved in 30 drops of alcohol. Ph. Centralhalle, No. 39, 1874, p. 328.

## INFUSA ET DECOCTA.

*Preservation of Infusions, Decoctions, etc.*—Aug. Almén has by his experiments (detailed in Arch. der Ph., Sept. 1874, pp. 217–235) become convinced that by the following simple arrangement and manipulations, infusions, decoctions, juices, syrups, etc., may be kept unchanged for a long time. The liquid to be preserved is introduced into a bottle so that it may reach to a little above the commencement of the neck; a cork is then introduced, which is provided with a glass tube about 2 inches long and 1 to 1½ lines internal diameter, and which is narrowed somewhat at the lower end; the tube being loosely filled with cotton, the cork is introduced into the bottle, which is then placed in a water-bath and heated, at the boiling-point of the bath, for some time. The air, originally in the bottle, is by this means completely expelled, and when the bottle is removed from the bath and is allowed to cool in the bath, the slowly returning air is filtered through the cotton, which retains the ferment-germs of the air. If the cork is besides provided with a siphon-tube, reaching to the bottom of the bottle, and kept closed with a caoutchouc tube and clamp after the air has been expelled, portions of the contents may be withdrawn as wanted, without injury to the remaining contents. Decoctum frangulæ was in this manner kept in perfectly good condition for thirteen months in a warm room; infusum rhei alkalinum a year and a half; infusum sennæ compositum a year and a half, etc. Experiments with milk, meat, etc., lead the author to similar results.

*Preservation of Infusions, etc., by Chloroform.*—J. B. Barnes has made some experiments upon the effect of chloroform in preserving vegetable infusions and other aqueous organic solutions, and has found that when chloroform is added to infusions of calumba, chiretta, malt, senna, and roses, in the proportion of 5 minims of the former to 8 fluid ounces of the last-named, they kept very well and apparently unchanged. Similar experiments upon mucilage of acacia and of tragacanth had the same results.

In support of this Mr. F. J. Barrett, in a paper on the same

subject, states that he has been in the habit of preserving the concentrated infusions used at the Wolverhampton and Staffordshire General Hospital, by adding to them chloroform in the proportion of 2 drachms to 4 pints, keeping the same in well-filled and well-stoppered bottles in a cool place. In this way he has kept infusions for two months. *Ph. Jour. Trans.*, December 5th, 1874, pp. 441-442.

The medicinal modification which infusions would undergo by the introduction of chloroform requires attention in this connection, and seems to be an objection to the application of the latter for the purpose described. This also seems to be the drift of the discussion on the above papers printed on p. 455 of the same journal.

*Infusum Cocæ.*—E. B. Shuttleworth proposes its preparation by infusing 1 ounce of bruised coca leaves in 10 fluid ounces of boiling water for an hour, and straining. Such an infusion resembles in appearance and odor an infusion of ordinary green tea, and has a slightly bitter and alkaline taste, recalling that of infusion of spearmint. The benumbing sensation experienced when chewing the leaves is not perceptible in this infusion. *Ph. Jour. Trans.*, December 19th, 1874, p. 484.

*Conc. Infusion of Gentian Co.*—Mr. Charles Symes having experienced trouble from the deposit produced in *mistura gentianæ comp.*, P. B., which corresponds in its ingredients and preparation to the comp. infusion of gentian of the U. S. Ph., recommends the preparation of a concentrated infusion as follows: Macerate 240 grains each of coriander and bitter orange-peel in 16 ounces of proof spirit; macerate 2 ounces of coarsely powdered gentian in three successive portions of distilled water, so as to make 1 pint (imp. meas.) of infusion; evaporate the infusion to 4 fluid ounces, and mix with the tincture of coriander and orange-peel (previously strained from the exhausted dregs). Upon mixing the infusion and tincture a mucilaginous precipitate forms, which is readily filtered off, furnishing a bright concentrated tincture, 1 part of which, mixed with 3 parts of distilled water, furnishes a

preparation which will compare favorably with, and contain nothing which is not contained in the *mist. gentianæ co.*, B. P. Ph. Jour. Trans., January 30th, 1875, p. 601.

*Misturæ v. Infusa.*—In the following are given some formulas for preparations, proposed by Mr. Charles Symes, and named by him “Mixtures,” but corresponding in their character to some of the infusions of our Pharmacopœia, and consequently placed under that heading in this report. It is to be regretted that the adoption of the *infusum gentianæ compositum* of our Pharmacopœia (or a very nearly corresponding preparation), by the British Pharmacopœia, should have necessitated a change in the name; and that the designation *mistura* in place of *infusum* should be perpetuated.

*Mistura Cinchonæ.*—Yellow bark, in coarse powder, powdered liquorice-root, each  $\frac{1}{2}$  ounce; dilute sulphuric acid, 50 minims; distilled water,  $\frac{1}{2}$  pint. Obtain 8 ounces of percolate, and add 2 ounces of proof spirit. In this pale cherry-colored preparation the bitterness of cinchona is covered to some extent by the liquorice. It keeps well for several weeks.

*Mistura Calumbæ.*—Macerate  $\frac{1}{2}$  ounce of coarsely powdered calumba root for two hours in 8 ounces of water. Macerate for the same period 20 grains of bruised cardamom seeds in 2 ounces of proof spirit. Strain, and mix the liquors. The preparation keeps well, and has a pleasant aromatic taste and odor.

*Mistura Rhei Comp.*—Infuse 150 grains of rhubarb root, in coarse powder, in 9 ounces of boiling water for two hours, strain, and produce  $8\frac{1}{2}$  ounces. Macerate 50 grains each of powdered pimento and powdered coriander in  $1\frac{1}{2}$  ounces of proof spirit, for two hours, and filter into the strained infusion. An elegant cordial aperient, which is not disagreeable and keeps well. Ph. J. Trans., March 20th, 1875, p. 741.

*Decoctum Salep.*—The formation of lumps when preparing decoctions of salep is entirely prevented, according to Depaifye, if the powder is first moistened with a few drops of alcohol, before it is submitted to the action of water. A. J. Ph., Sept., 1874, p. 417; from Jour. de Ph. d’Anvers, 1874.

## LINIMENTA.

*Liniments of the British Pharmacopœia.*—C. R. C. Tichborne suggests the introduction of oleic acid into some of the liniments of the British Pharmacopœia in lieu of the fixed oils now used. The kind of oleic acid best adapted for this purpose is that known in British commerce as “pale cloth oil,” which should, however, be fresh, as it does not improve by age. The author suggests the following modifications:

*Linimentum ammoniæ* (B. P.).—Mix 3ss. of oleic acid with 3ij of water, and add 3iss. of strong solution of ammonia, with agitation.

*Linimentum Potassii Iodidi cum Sapone* (B. P.).—Dissolve 2 ounces of carbonate of potassium in 10 ounces of water, and add 6 ounces of oleic acid; after effervescence has subsided, add 7½ ounces of iodide of potassium, 5 ounces of glycerin, and 5 drachms of oil of lemon, and then sufficient solution of potash to make it the requisite consistency.

*Linimentum Saponis* (B. P.).—Dissolve 4 ounces of carbonate of sodium in 8 ounces of water, by the aid of heat, and add gradually 8 ounces of oleic acid; when the effervescence has subsided, add 12 drachms oil of rosemary, and 5 ounces of camphor, dissolved in 3 pints and 12 ounces of rectified spirit, and filter.

*Linimentum Terebinthinæ.*—Dissolve 1 ounce each of oleic acid and camphor in 16 ounces of oil of turpentine, and add sufficient solution of potassa to produce an emulsion, with constant stirring. Proc. Br. Ph. Conf., 1874, p. 530.

*Liniment of Belladonna* (B. P.).—Mr. Charles Umney has made some experiments, which tend to show that the belladonna liniment of the British Pharmacopœia, as prepared according to that standard, is apt to contain little more than 83 per cent. of the soluble constituents. Operating upon 100 grams of belladonna root, in moderately fine powder (passed through a sieve forty to fifty meshes to the inch), by maceration and displacement, he obtained from the first 100 c.c. of



percolate, 7.58 grams of extract; from the second, 4.31 grams; from the third, 3.08 grams; from the fourth, 2.25 grams; from the fifth, 1.54 grams. The total extract (dried at a temperature of 212° F. as long as it lost weight) was 18.75 per cent., 40 per cent. of which was contained in the first percolate, 22.9 per cent. in the second percolate, etc. From this it appears that the formula of the British Pharmacopœia is faulty, and that even if the greater part of the atropia is contained in the first portion of extracted matter, a portion is evidently lost, and consequently wasted. The author suggests a revision of the formula, and that either the quantity of belladonna root be reduced to one-half, or that 1 part of alcoholic extract of belladonna be dissolved in 10 parts of spirit of wine. Ph. Jour. Trans., October 10th, 1874, p. 281.

*Linimentum Saponis*.—F. M. Goodman has made a series of comparative experiments upon the influence of heat, of stronger alcohol, and upon the condition of the soap used in making soap liniment, and finds that the officinal formula is a good and proper one, if the soap is used dry (coarse powder), and if the ingredients are all mixed in a bottle, placed in a warm place, and agitated occasionally until solution is effected. The Pharm., June, 1875, p. 161.

*Lotion of Chloral and Iodine* is proposed by Mr. Robert F. Fairthorne, the following being his formula: Iodine, 20 grains; iodide of potassium, 6 grains; glycerin, 1 fluid ounce; chloral hydrate, 2 drachms. A. J. Ph., December, 1874, p. 550.

*Cream of Camphor*.—Otto Kraus suggests the following formula for "cream of camphor," which, he states, is found useful for inflammatory affections of the throat, and superior for that purpose to the linimentum ammoniæ, United States Pharmacopœia: Dissolve one and a half ounces of white Castile soap shavings in three pints of water. Dissolve two ounces of carbonate of ammonium in one pint of water. The two solutions are mixed, and two ounces of camphor, rubbed to a thin paste with alcohol, is added, and the mixture shaken briskly. Oil of turpentine is then added in sufficient quantity,



to bring the mixture to the consistence of a cream, on brisk agitation; after which, one fluid ounce each of tincture of opium and oil of origanum is added, and the whole well mixed. A. J. Ph., June, 1875, p. 257.

*Liniment for Scabies.*—Dr. Clemens gives the following formula; Take of arsenious acid, 1 grain; carbonate of potassium, 15 grains; spirit of soap, 3 drachms; spring water, 3 ounces. The liniment, to be rubbed twice a day on the part affected, does not harm the youngest child. The Practitioner (Lond.), February, 1875, p. 135.

#### LIQUORES.

*Liquor Opii Sedativus* (Battley's Sedative).—Mr. P. Wells remarks that numerous papers on the subject of its preparation have been published from time to time, but none of their authors seem to believe in the statement of the inventor, the late Mr. Richard Battley, that it was composed of opium and water. The author, relying on the accuracy of the statement in question, has prepared it for about thirty-three years by essentially the following method: Select 12 ounces of the finest Turkey opium, sufficiently dry to be reduced to a moderately coarse powder, and mix with a proper quantity of clean sand. Then percolate with water, until the percolate passes nearly colorless; mix the liquors, allow to stand a few hours, strain, and evaporate over the naked fire in an enamelled pan by rather rapid ebullition to about 3 imperial quarts. This is allowed to stand in an open jar for fully twelve hours, carefully strained to remove resin and flocculent matter, and boiled down to 3 pints. After standing for twelve hours in a cool place, it is now filtered through paper, 14 ounces of rectified spirit, 60 o. p. (over proof?), added, and made up to 4 imperial pints with distilled water. Ph. Jour. Trans., October 10th, 1874, p. 281.

*Liquor Rhamni Frangulæ.*—Under *Materia Medica*, in this report, will be found an extract from a paper on the experience of Mr. H. C. Baildon with the bark of the European black alder. Mr. Joseph Ince, reviewing the various au-

thorities on this subject, draws attention to the following formula, proposed by Mr. Baidon, for preparing the above-named preparation: Take of the bark of rhamn. frang., 60 ounces; exhaust by decoction, and reduce to 320 fluid ounces. Add of rectified spirit, 80 ounces. Mr. Baidon recommends the concentration of the decoction in vacuo. The dose is 1 dessert or tablespoonful, in a wineglass of water, night and morning as required. Mr. Ince recommends the preparation to the attention of the Medical Council, when the time comes for the new Addendum (to the Br. Ph.), and states that it has already been generally accepted as a safe, pleasant, and efficient purgative. Ch. and Dr., June 15th, 1874, p. 186.

*Liquor Sennæ.*—Percy Wells gives a formula for liquor sennæ, which he has, in an experience of twenty-seven years, uniformly found to be an active but not griping purgative: A mixture of 13 ounces water, 3 ounces rectified spirit, and 30 minims of liquor potassæ, is poured over 6 ounces of small sifted Alexandrian senna. It is kept in a corked jar, and stirred occasionally for seven days, is then strained, and expressed by strong pressure through fine muslin or calico. A slight deposit will form in about a week, from which the clear liquid is decanted, and may be filtered. 1 part of this liquor, mixed with 3 parts of water, forms a preparation equal to infus. sennæ, P. L. Ph. J. Trans., May 8th, 1875, p. 886.

*Liquor Ammonii Acetatis.*—Louis Siebold draws attention to the presence of lead in solutions of acetate of ammonium, the source of which he attributes to the glass in which it is stored. Its power to abstract lead from glass has not previously been observed, although it is well known to possess the property of dissolving sulphate of lead and other insoluble lead compounds. The author's results are based on accurate observation. Proc. Br. Ph. Conf., 1874, p. 549.

*Solution of Citrate of Magnesium.*—Mr. Albert C. Wherli suggests that this solution be kept filled in bottles without adding to it the bicarbonate of potassium necessary to generate the carbonic acid; that salt being added when dispensing. He thinks that in that state it will keep better than

when it is kept in the completed condition. While there are obvious advantages in keeping the solution as the author suggests, the statement that the preparation, when made according to the officinal process, is one of the "bugbears" of the conscientious pharmacist is unjust, inasmuch as the process succeeds admirably in the hands of many "conscientious" pharmacists. *The Pharmacist*, January, 1875, p. 3.

*Liquor Potassii Citratis*.—Aug. Hohl proposes to keep solutions of citric acid, and of bicarbonate of potassium, in such proportions that when equal measures are mixed the neutral mixture of the U. S. Pharmacopœia is formed. The solution of citric acid is made by dissolving 3j citric acid in f3viij of water, and filtering; that of bicarbonate of potassium, 3xj of the bicarbonate in f3viij of distilled water, and filtering. *A. J. Ph.*, May, 1875, p. 202.

*Liquor Sodii Tartratis*.—Dr. Charles G. Polk dissolves 10 ounces of carbonate of sodium and 16 drops of oil of lemon in 3 pints of boiling water, adds to this liquid a solution of 7½ ounces of tartaric acid and 18 ounces of sugar in the same quantity of water, filters the mixture as soon as effervescence ceases, divides into 12 bottles, adds to each bottle a half drachm of bicarbonate of sodium, corking them tightly. The result is a perfectly clear, permanent, and pleasant preparation. *Am. Dr. Circ.*, September, 1874, p. 155.

The author has modified the above formula, using 8 ounces of tartaric acid, only 16 ounces of sugar, and flavor with half a lemon-peel. *Ibid.*, March, 1875, p. 59.

*Solution of Bromide of Iron*.—Mr. Prince proposes a standard solution of bromide of iron, a form convenient for preparing the dry salt or any of its preparations at short notice. 100 grams of iron filings, free from rust, 768 grams of water, and 210 grams of bromine are the proportions; the first two being placed into a suitable flask, and the last named is added in five portions, the flask being after each addition well stopped with a cork. After combination has been effected, the contents of the flask, including the excess of iron, are transferred to a suitable bottle, which is kept well stopped.

30 grams of the clear liquid should yield, on evaporation to dryness, exactly 10 grams of the bromide. A. J. Ph., September, 1874, p. 415; from L'Union Pharm., July, 1874.

*Solution of Phosphorus.*—To produce a solution of phosphorus in alcohol it is necessary to heat to near the boiling-point of alcohol for nearly twenty-four hours; but warm glycerin dissolves phosphorus readily by agitating it a few minutes, and retains it in solution upon addition of warm alcohol. Such a solution of phosphorus seems also to be less liable to oxidation than is one in alcohol alone. Arch. Pharm, February, 1875, p. 167; Ph. Jour. Trans., September, 1874.

J. Williams states that the proper quantity of phosphorus to be dissolved in a mixture of equal parts of absolute alcohol and glycerin is from  $\frac{1}{8}$ th to  $\frac{1}{4}$ th grain in a fluid drachm. Proc. Br. Ph. Conf., 1874, pp. 588–592.

*Solution of Croton Chloral Hydrate.*—Mr. G. J. Luhn suggests the following formula for the exhibition of croton chloral hydrate in solution: Take of croton chloral hydrate 24 grains; tincture of orange-peel, 1 fluid drachm; glycerin, water, of each 2 fluid drachms; simple syrup, 7 fluid drachms. Mix in the order given. A clear brownish solution is formed. A. J. Pharm., July, 1874, p. 307.

*Hypodermic Solutions of Quinia.*—Mr. A. P. Sharp suggests two forms of solution of quinia for hypodermic injection, in both of which lactic acid is the solvent, and alcohol in one, and bisulphite of sodium in the other, the preservative agent. See Proceedings, 1874, p. 377.

*Hypodermic Solution of Monobromated Camphor.*—When the administration of monobromated camphor by the mouth is impracticable, Dr. Bourneville proposes the following solution for subcutaneous injection: Monobromated camphor, 3 grains; alcohol, 35 grains; glycerin, 22 grains. Ph. Jour. Trans., October 24th, 1874, p. 322.

#### MISTURÆ.

*Mistura Asafoetidæ.*—Mr. J. W. Wood proposes its preparation from a concentrated mixture, which he prepares as fol-

lows: Two ounces of asafœtida is cut into small pieces, and is moderately heated in a capsule with six ounces of glycerin, constantly triturating the mixture with a pestle. Solution is effected in a short time, the result being a liquid, not too thick for easy manipulation, each troy drachm of which contains 15 grains of the gum resin. The asafœtida should be selected. Mixed with the proper quantity of water a handsome preparation, much less susceptible to change than the officinal mixture, is obtained.

*Mistura Ammoniaci* is prepared by the author from a concentrated mixture of ammoniacum, prepared precisely like the above, and the result is equal if not superior to that obtained by following the officinal directions. A. J. Ph., 1874, July, pp. 309, 310.

*Magnesia Mixtures.*—Mr. Hans M. Wilder, having his attention drawn to excessive quantities of magnesia prescribed in a given quantity of liquid, has made some experiments and has arrived at the following results: To mix light calcined magnesia with not less than twelve parts of water, or, where the amount of liquid cannot be increased, to use heavy calcined magnesia. A. J. Ph., October, 1874, p. 467.

*Sulphite of Magnesium Mixture.*—Dr. Schottin has used the following mixture with great success in diphtheria, the dose being a dessertspoonful for children and a tablespoonful for adults, every two hours, with the simultaneous application of cold water applications to the neck. R. *Magnesiæ sulphitis*, 5.0; *acidi sulphurosi*, 5.0–8.0; *aquæ destillatæ*, 100.0–120.0. Mix and agitate. Ph. Centralhalle, No. 53, 1874, p. 436.

*Chloroform Mixture.*—Landerer recommends the following mixture to persons who are subject to sea-sickness: Chloroform, 8 grams; *tinctura aromatico amara*, 15 grams; *syrupus aurantiorum*, 30 grams. A few drops of this, taken several times a day while at sea, has a remarkably salient effect in relieving the nausea of sea-sickness. It is, however, by no means a specific for that purpose, the author claiming simply that it is the best palliative he has recom-

mended in his large experience. N. Rep. Ph., Nos. 8, 9, 1874, p. 570.

*Mistura Glycyrrhizæ Composita.*—H. M. Wilder recommends the substitution of the purified extract of liquorice of the German Pharmacopœia, and of gum arabic in lumps for the powdered extract of liquorice and the powdered gum arabic directed in the U. S. formula for mist. glycyrrh. comp. As a consequence, also the introduction of purified extract of liquorice into our national standard. The modification suggested by the author insures a clear instead of a turbid mixture. A. J. Ph., March, 1875, p. 97.

*Castor Oil Mixture.*—Potain recommends as the best method for concealing the unpleasant flavor of castor oil, to squeeze half an orange into a glass and pour the oil upon it; then, avoiding all disturbance of the liquids, to squeeze the juice from the other half of the orange carefully over it. The oil thus inclosed between two layers of orange juice can be swallowed without the least perception of its flavor. The Practitioner (Lond.), February, 1875, p. 135.

*Castor Oil Mixture.*—The following formula is suggested by Clay W. Holmes: Pulv. gum arabic, ʒj; syrup, glycerin, āā fʒj; water, fʒiij; castor oil, fʒvj; ext. vanilla, brandy, āā fʒij; oil of cinnamon (true), gtt. v. Mix properly. See Proceedings, 1874, p. 378.

*Emulsion of Phosphorated Oil.*—Professor Redwood recommends the following method of preparing phosphorus for internal administration, believing that in form of solution phosphorus is most effective, while the particular preparation recommended is readily taken, and will keep for a reasonable length of time: Take one drachm of phosphorated oil, two drachms of yolk of egg, six drachms of syrup of tolu, and sufficient chloroform-water to make five ounces and seven drachms. Make an emulsion and add one drachm of liquor potassa. The chloroform-water is used instead of ordinary water to prevent the decomposition of the yolk of egg. Ph. Jour. Trans., November 7th, 1874, p. 374.

*Emulsio Carnis.*—Mr. James Kemble, after considerable ex-

periments with a view to forming an emulsion of raw beef that would keep long enough without change to be of practical use, proposes the following formula as securing the desired end:

Rub or beat fresh raw-beef (lean), ℥vj; sweet almonds, deprived of their shells and roasted, ℥j; bitter almonds, ℥vj; and sugar, ℥vj, to a fine pulp in a Wedgwood or wooden mortar, then add water gradually until a smooth emulsion is formed, and strain through a sieve or coarse cloth; return the residuary mass to the mortar, manipulate with sufficient water until f℥xiv are obtained, strain through a finer strainer, add ℥ij of glycerin and bottle; the bottle to be kept well corked. Dose: f℥j, containing ℥iij of beef. The emulsion may be prescribed with brandy, pepsin, or any other medicines that it is desirable to administer. The object of roasting the sweet almonds is to destroy the emulsin which might incite fermentation. A. J. Ph., October, 1874, p. 464.

*Emulsion of Cod-liver Oil made with Glyconin*, and containing phosphoric acid, has been in use for a long time in the Utica Insane Asylum. The following formula is given: Cod-liver oil, ℥iv; glyconin, ℥ix. To the latter 30 drops of oil of bitter almonds is added, and then the cod-liver oil is added very slowly, drop by drop, stirring vigorously all the time; the success depending upon the thoroughness with which this part of the process is done. 2 ounces Jamaica rum and ℥ss. to ℥j of dilute phosphoric acid are then incorporated with the mixture. *Glyconin* is prepared by thoroughly triturating together equal parts of glycerin and yolk of eggs. Am. Dr. Circ., September, 1874, p. 155.

The above formula has since been modified at the suggestion of G. C. Close, the ingredients being as follows: Cod-liver oil, 4 ounces; glyconin, 9 drachms; aromatic spirit of ammonia, 1 drachm; sherry wine, 16 drachms; diluted phosphoric acid, 4 drachms; essence of bitter almonds, 2 drachms. It is sometimes desirable to give the emulsion in conjunction with iron, for which purpose the tasteless tincture of iron is recommended by Mr. Close as the most suitable. Ibid., October, 1874, p. 179.



*Cod-liver Oil and Pancreatin Mixture.*—J. S. Plumb has devised the following formulas for cod-liver oil and pancreatin mixtures, which are recommended by Dr. F. C. Clarke: (1.) Cod-liver oil, f℥ix; saccharated pancreatin, grs. cclxx; acid. phosph. dil., f℥iv; fluid ext. sweet orange-peel, f℥ss. M. Or (2.) Cod-liver oil, f℥vj; saccharated pancreatin, grs. clxxx; muriatic acid, f℥ss.; fluid ext. sweet orange-peel, f℥ss.; water, f℥xj. M. In either case the pancreatin acid (and water) are shaken thoroughly in a pint bottle, the oil is then added, and after thorough agitation the fluid extract. Dr. Clarke prefers the first formula. Am. Dr. Circ., August, 1874, p. 139.

*Emulsion of Cod-liver Oil and Hypophosphites.*—"Monad" recommends the following formula in Can. Ph. Jour., March, 1875, p. 273: Make a mucilage of  $\frac{1}{2}$  ounce powdered tragacanth, 3 ounces glycerin, and 9 ounces water; add to this a solution of  $4\frac{1}{2}$  drachms of hypophosphite of calcium,  $2\frac{1}{2}$  drachms each of hypophosphite of sodium and hypophosphite of potassium,  $\frac{1}{4}$  pound (av.?) of sugar in 12 ounces of boiling water; flavor this with 10 drops oil of almonds, 5 drops each of oil of cinnamon and oil of canella, dissolved in 6 ounces of alcohol; mix well, and to make the emulsion, use an equal measure of this medicated mucilage and of cod-liver oil, adding the latter gradually and mixing thoroughly. A half pint of each of these are found in practice to be the best working quantities.

*Cod-liver Oil with Quinia.*—M. H. Stiles proposes its preparation by precipitating 60 grains of sulphate of quinia, washing the alkaloid, drying it by the heat of a water-bath, dissolving the dried quinia in 1 fluid ounce of purified oleic acid by the aid of gentle heat, mixing this solution of oleate of quinia with 5 ounces of warmed cod-liver oil, filtering this mixture, and bring with cod-liver oil to the measure of 30 fluid ounces. A permanent solution is formed, which is decidedly preferable to the usual preparation, containing the quinia dissolved in ether. Ph. Jour. Trans., February 13th, 1875, p. 641.

*Villate's Mixture.*—The following formula is given for this



mixture, which has been used with great success in the treatment of caries of bones in animals: Solution of subacetate of lead, f℥j; crystallized sulphate of zinc, crystallized sulphate of copper, of each, ℥ss.; white wine vinegar, f℥viss. Dissolve the salts in the vinegar, and add the solution of subacetate of lead. Shake before using. It is important that this mixture should be made exactly as stated. Am. Dr. Circ., September, 1874, p. 158.

*Artichoke Mixture.*—Dr. Copeman recommends the following mixture for rheumatism, the virtues of which depend mainly on a tincture of artichoke leaves (for which he does not give a formula, however). The leaves must be collected at the proper time, to insure their efficiency (see *Cynara* in this report). Bicarb. potass., ℥j; tinct. cynaræ, ℥j; syrup. papaver., ℥ss.; aqua camphoræ, ad ℥viiij. M. Two tablespoonfuls is the dose, repeated every four hours, with two moderately sized pills of extract of cynara. The Practitioner (Lond.), February, 1875, p. 129.

*Trimethylamin Mixture.*—Dr. W. H. Spencer recommends the following mixture for the administration of trimethylamin (propylamin) in rheumatism, such a mixture being generally acceptable to the patient: Trimethylamin (propylamin of commerce containing 20 per cent.), ℥iv (vel ℥viiij); syrup. zingib., ℥j; aquæ menthæ pip., ℥j. Misce. This constitutes one dose, which is to be repeated every one, two, or four hours, according to circumstances. The Practitioner (Lond.), February, 1875, p. 95.

*Mixture for Seasickness.*—Dr. Giraldès has tried with success on his own person, and recommends the following mixture for the prevention of seasickness: Chloral, 3 grams; distilled water, 50 grams; gooseberry syrup, 60 grams; French essence of peppermint, 2 drops. One-half at a draught. The preventive, of course, is the chloral. A. J. Ph., March, 1875, p. 131; from Medical News, February, 1875.

#### MUCILAGINES.

*Mucilago Acaciæ.*—Archer & Co., of Norfolk, Va., find that

when mucilage of gum arabic is made with "tolu-water," instead of ordinary water, it will keep perfectly well for several months. The slight odor and taste of tolu they regard as unobjectionable. The tolu-water is made by triturating ℥ij tinct. tolu with ℥iv carb. magnesium, then with Oij of water, and filtering. A. J. Ph., October, 1874, p. 468.

#### PILULÆ.

*Pill Coating.*—Mr. J. A. Cope proposes the following simple method of coating pills, using therefor powdered French chalk and thin mucilage of gum arabic; one part mucilage of the British Pharmacopœia to two parts of distilled water, and the pills produced have an elegant appearance and are satisfactory in every respect. Into a small gallipot put some of the chalk, and into a basin put as much mucilage as may be necessary to thoroughly moisten the quantity of pills to be coated. Next put in the pills, shake them around horizontally until sufficiently moistened, then turn them into the pot containing the chalk, and shake them round so as to get well covered with the powder; turn them out on to a pill-tray, allow them to remain for a short time, and lastly shake them in a clean gallipot, so as to polish them and shake off the superfluous powder. The pills to be coated should be of good consistence, not too hard, and rolled perfectly round, using French chalk to roll them in. Pharm. Jour. Trans., May 30th, 1874, p. 953.

Mr. John Whitfield proposes a method of coating pills with a varnish, made as follows: Common amber rosin, 1 to 2 drachms; spirit of turpentine, 1 drachm; oil of geranium, 20 minims; absolute alcohol, to make 1 ounce.

The details of his method are essentially the same as those of Mr. Cope; but the pills should be made as hard as possible. Some pills take the coating better than others, but a second coating seldom fails. When placed into water the coating cracks and exposes the pill more rapidly than sugar coating. Ibid.

*Pills of Sulphate of Quinia.*—Mr. H. P. Reynolds finds ob-

jection to the officinal process for quinia pills, on account of the size and their unsightliness; to the use of glycerin alone, because the pills become large and the mass is apt to be either soft or brittle; to the use of dilute sulphuric acid, because the mass is too apt to harden before the pills are shaped. He finds the use of tartaric acid along with glycerin to give unexceptionable results, and recommends the following proportions: Sulphate of quinia, 600 grains; tartaric acid, 100 grains; pure glycerin, 75 minims. A firm mass is formed, which rolls well, does not set for some hours, and forms a small pill which, when rolled in starch-powder, are beautifully white, and remain perfectly soluble, however dry and old they may become. The quantity of glycerin given, apparently small, is just the quantity required; a few drops more rendering the mass inconveniently sticky. *Am. J. Ph.*, September, 1874, p. 404,

*Sugar-coated Quinia Pills.*—H. Trimble has examined a number of commercial sugar-coated quinia pills, and among seven different samples found five to contain the requisite quantity of sulphate of quinia, one to be deficient, and one to contain muriate of cinchonia; the last mentioned being the manufacture of a Cincinnati firm, while the others were of Philadelphia manufacture. Among the Philadelphia made pills, two samples dissolved very readily in acidulated water, while the coating on the others rendered them very difficult of solubility. The author observes very correctly that the persistent vigilance of the pharmacist, is the only remedy and safeguard against impositions of the character above named. *A. J. Ph.*, April, 1875, p. 163.

L. C. Hogan has examined eight samples of two-grain quinia pills of various prominent manufacturers, using five pills of each kind in his experiments, and compared them with a standard pill carefully made by himself. The following table gives his results:

Five two-grain Quinia Pills.	Gross weight of one two-grain pill.	Weight of same pill after coating was removed.	Average quantity of Quinia in five two-grain pills. (Three assays.)	Average quantity of Sulphate of Quinia in five two-grain pills. (Three assays.)
Standard.	2.80	2.8	7.40	10.00
A	4.20	2.1	6.85	9.22
B	5.20	2.4	6.65	8.98
C	4.60	2.8	6.60	8.91
D	4.00	2.0	5.73	8.19
E	4.05	2.5	5.56	7.68
F	8.25	2.5	5.85	7.22
G	8.40	1.8	4.55	6.82
H	4.25	1.8	8.78	5.56

The Pharm., May, 1875, p. 142.

*Phosphorus Pills.*—William H. Walling recommends butter of cacao as an excipient for phosphorus pills, and gives the following formula: Butter of cacao, 300 grains; powdered castile soap, 200 grains; phosphorus, 25 grains. Melt the butter of cacao in a capsule, transfer to a quinine bottle, add phosphorus and shake vigorously; add the soap and continue the agitation, applying some heat, if necessary, until the phosphorus is all taken up. The mass is easily, if rapidly, worked. Make into 500 pills, containing  $\frac{1}{20}$ th grain of phosphorus each. Coat with mucilage of gum arabic and French chalk. They will stand a dry heat of 110° F. without running together.

Comparative experiments made with two commercial sugar-coated pills, a pill made by incorporating the phosphorus with balsam of tolu, and a pill made according to the above, showed the latter to dissolve very rapidly in warm water; dissolving completely in five minutes, while the two commercial pills remained intact, with the exception of their sugar-coating, after half an hour exposure to 110°, and the balsam of tolu pill was simply softened. A. J. Ph., June, 1875, p. 253.

Dr. Ch. C. Frownert made some experiments which seem

to prove the pills as above made, to be more active than such made with silica as an excipient, while pills with tolu balsam as an excipient, passed with the evacuations of the patient in their entire condition. Ibid., p. 254.

As a substitute for resin, as recommended by Mr. Gerrard for the medicinal exhibition of phosphorus, Mr. A. C. Abraham proposes washed tolu, which permits the preparation of a phosphorated resin at a temperature below the boiling-point of water, and consequently obviates the danger to the operator and the deterioration of the product by conversion into amorphous phosphorus, or by its oxidation. Four grains of phosphorus are perfectly dissolved by 96 grains of washed tolu, if melted together under water and well stirred. The preparation so made, when examined microscopically, does not show any particles of undissolved phosphorus, and may, therefore, be formed into pills, with every confidence in the equal distribution of the phosphorus. Ph. Jour. Trans., January 10th, 1874, p. 549.

*Pills of Amorphous Phosphorus.*—According to A. W. Postans, amorphous phosphorus is readily manipulated and made into pills or powders, from which chlorate of potassium alone is excluded. The following formula for pills is recommended: Amorphous phosphorus, 6 grains; liquorice powder, extract of taraxacum, of each, 3 grains. Mix and make six pills, which may be coated with silver-foil, sugar, tolu, etc., and keep well. See Amorphous Phosphorus in this report. Ph. Jour. Trans., November 7th, 1874, p. 364.

*Pil. Ferri et Aloes, B. P.*—Dr. William Craig, who has made some extensive experiments upon the physiological action of aloes and some of its constituents, believes the following modification of the iron and aloes pil. of the Br. Ph. to be superior to the officinal pil.: Aloin, gr. ss.; ferri sulph. exsic., gr. iss.; extract. nucis vom., gr. ss.; extract. belladon., gr. ss. Fiat pilula. An excellent pill for the constipation so common in females of a sedentary habit; one or two being a daily dose. Ph. Jour. Trans., April 17th, 1875, p. 832. See also "Aloes" in this report.

*Pills of Bromide of Iron* are proposed to be prepared by Prince, by evaporating 12 grams of the standard solution of bromide of iron proposed by him (see Liquores in this report) with 0.1 gram powdered iron to expel all the water, and rapidly mixing the residue, while still hot, in a warm and dry mortar, with sufficient powdered liquorice-root and gum-arabic; the mass to be divided into eighty pills. A. J. Ph., September, 1874, p. 415; from L'Union Pharm., July, 1874.

*Pills of Iodized Albumen* are recommended by Collas as a means of administering a definite amount of iodine, with avoidance of irritant action. A concentrated solution of iodine in some proper solvent is thoroughly agitated with albumen. The mixture, which at first becomes deep brown, after some hours becomes colorless, and does not give a violet color with starch. The product is then dried by gentle heat and made into pills containing 5 milligrams of iodine each, of which five to six may be administered daily. Chem. and Drug., March 15th, 1875, p. 79.

#### PULVERES.

*Powder Wafers.*—The objection to the use of wafers as an envelope for powders, is the necessarily large bulk. Nevertheless they are used to a considerable extent, and it is therefore not surprising that efforts should be made to overcome the objection of bulk. This has been accomplished by Limousin, who invented the apparatus illustrated by Fig. 24.

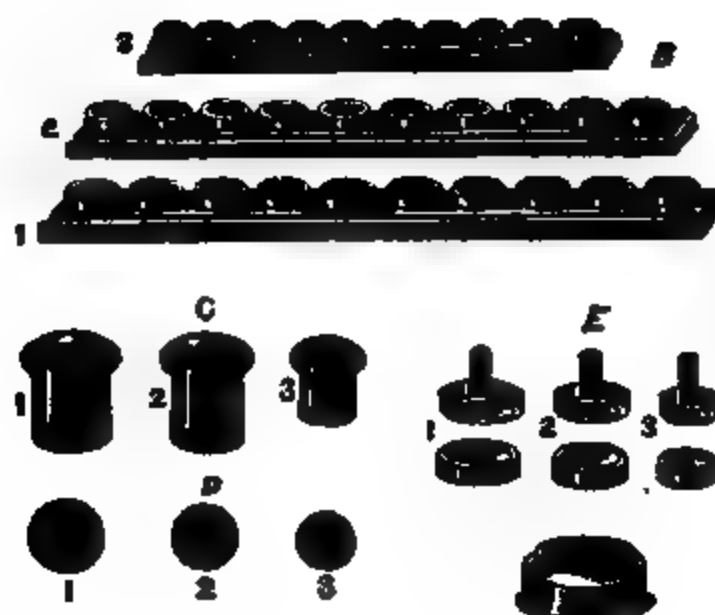
This consists: (1) of a press (*A*) with movable matrices (*E*), which permit the use of wafers of three different sizes; (2) of the wooden board (*B*), provided with hollow disks, corresponding in size to the wafers, (3) of three moisteners (*C*) made of metallic with intermediate cotton fabric, for moistening the edges of the wafers; (4) of a porcelain jar, containing a disk of felt, moistened with water.

The wafers are placed upon the disks of one of the boards (*B*), and the powder is placed as near as possible in the centre of each wafer, and, if necessary, slightly pressed on. The edge of the wafer which shall serve as the cover is now

moistened by means of the moistener (C). The moistened wafer is then laid upon the powder, the two wafers inclosing the powder are laid upon the matrix, and are united by the necessary pressure. Ph. Centralh., No. 18, 1875, p. 145.

Limousin furnishes the apparatus for this purpose, as well as the wafers, which are properly shaped (concave) so as to

FIG. 24.



contain the largest possible quantity of powder. Sauter, of Geneva, also offers the apparatus and wafers; but the latter are not as desirable as those made by Limousin, since they

are more flat, and do not consequently hold as much powder. Schweitzer. Wochenschr., March 19th, 1875, pp. 94-97.

*Effervescing Citrates and Tartrates.*—William Schrage has examined a number of effervescing citrates and tartrates of commerce with the following results:

1. "Effervescing Citrate of Magnesium," H. W. Swift & Bro.:

Sodium Carbonate, . . . . .	0.182
Sodium Tartrate, . . . . .	0.265
Tartaric Acid, . . . . .	0.205
Sulphuric Acid (trace), }	0.898
Sugar, Water, etc., }	
	<hr/> 1.000

2. "Effervescing Citrate of Magnesium," Nichols & Co.:

Magnesium Sulphate (anhydrous), . . . . .	0.122
Sodium Carbonate (dried), . . . . .	0.242
Tartaric Acid, . . . . .	0.430
Sugar, Water, etc., . . . . .	0.260
	<hr/> 1 000

3. "Magnesia Aperient," Billings, Clapp & Co.: The qualitative examination proved the presence of magnesium sulphate, sodium carbonate or bicarbonate, potassium (bicarbonate or sodio-tartrate), tartaric acid, sugar.

4. "Citrate of Magnesia," W. J. Gordon: A neutral magnesium citrate, dissolving with difficulty; not effervescing.

5. "Tarrant's Seltzer Aperient" was found to contain magnesium sulphate, sodium bicarbonate, potassium bicarbonate, tartaric acid, sugar.

6. "Prepared Citrate of Magnesia," Charles Ellis & Co., was found to contain magnesium citrate, sodium bicarbonate, a trace of potassium salt, citric acid, sugar.

The author details the methods pursued by him in his analysis, for which see American Journal of Pharmacy, February, 1875, pp. 60-65.

*Ferrum Oxydatum Saccharatum Solubile.*—E. Hoffmann, for various reasons given in his paper, recommends the following modification for the preparation of this officinal of the German Pharmacopœia:



10 parts solution of chloride of iron, sp. gr. 1.48 = 15 per cent. metallic iron.

4½ parts powdered sugar dissolved (immediately before using) in an equal weight of water.

12 parts pure soda (carbonate) dissolved in twice its weight of water.

5 parts caustic soda solution, or 6 parts of caustic potassa solution, of sp. gr. 1.33.

400 parts boiling water.

12 parts powdered sugar.

The solutions of sugar and chloride of iron are mixed in a capacious porcelain vessel, and the solution of carbonate of sodium is gradually added, allowing the carbonic acid to escape after each addition. Upon the addition of the solution of caustic soda (or potassa), a clear solution is formed, which is immediately thrown into the boiling-hot water, the precipitate allowed to subside, and washed four to six times with hot water by decantation. It is then allowed to drain, and is then expressed by gentle pressure. The precipitate, so prepared, is then mixed with the 12 parts of sugar of the above formula, is evaporated on a water-bath to the consistence of honey, is then spread on flat plates, and dried in a drying-closet. The product, finely powdered, may then be brought to 50 parts by the addition of finely-powdered sugar, which should be mixed with the addition of a few drops of alcohol, and then again dried. So prepared, the product is perfectly soluble in water. Arch. Ph., August, 1874, pp. 134–138.

*Powder for Preventing Cicatrization of Small-pox Pustules.*—Dr. Pennararia, of Sicily, recommends a powder composed of 4 parts of flowers of sulphur and 1 part of red precipitate. In using it, a drop of glycerin is placed on the pustules, and the powder sprinkled over this. The crust becomes detached in a few days, leaving the skin intact, without even a stain. Am. Practitioner, February, 1875, p. 104.

*Bernese Wafer-press.*—B. Studer, Jr., describes a wafer-press, which recommends itself for its simplicity. It is illustrated by Fig. 25, and is composed of two cylindrical metallic clasps,

united by a hinge, which are fastened upon a wooden base (10 centimetres long,  $7\frac{1}{2}$  centimetres wide, and 3 centimetres high). Two concentric rings are provided on the lower clasp, the inner one somewhat deeper than the outer, and corresponding to the two larger sizes (?) of wafers. A *concave* stamp, corresponding to the size of the wafer used, is screwed into the upper part of the clasp, by means of which the moistened edges of the wafers are pressed together. The handle *a* communicates with a small lever beneath the clasp, by which the finished wafer is lifted out of the ring. The powder is

FIGS. 25, 26, 27.

2

poured upon the wafer by means of the short brass ring (Fig. 26), and is compressed with the plug (Fig. 27) before placing the top wafer upon it. The edges are best moistened by means of a camel's-hair pencil. The moistening arrangements of Limousin, and others, have been tried by the author, and are not so satisfactory. In fact the apparatus seems, owing to its simplicity, to be the peer of Limousin's and all others that have been described. Schweitz. Wochenschr., No. 21, p. 175.

*Powdered Blue Mass.*—As a substitute for powdered blue mass, Mr. J. F. Hancock proposes that 384 grains of mercury, and 200 grains of granulated sugar, be formed into a paste, with sufficient syrup, and triturated until the mercury globules have disappeared. It is then dried with free exposure to air; when sufficiently dry, is mixed with sufficient sugar to bring the weight to 1152 grains, and is then exposed to the air ten days longer, which has for its object the gradual oxidation of the metallic mercury. It is scarcely necessary to remark that such a preparation should not be substituted for powdered blue mass without the authority of the prescriber. See Proceedings, 1874, p. 374.

*Granular Effervescing Preparation.*—For some remarks on these, see a paper read before this Association, at the last annual meeting, in Proceedings, 1874, p. 368.

#### SAPONES.

*Arsenical Soap* (Taxidermist's use).—Take 1 part each of camphor, arsenious acid, and Castile soap, all in very fine powder, and 12 parts of carbonate of potassium; make into a paste with water. Used in preserving the skins of birds and other animals. A. E. Ebert, Collated Practical Receipts, in The Pharm., April, 1875.

*Chlorinated Soap* (Savon Antisyphilitique).—Take 11 parts of Castile soap, in fine powder, and 1 part of dry and good chlorinated lime; mix, and beat into a mass with sufficiently perfumed spirit. Ibid.

*Iodine Soap.*—Take 16 parts of white Castile soap, sliced, 1 part of iodide of potassium, and 3 parts of water. Dissolve the iodide of potassium in the water, place, with the soap, in a porcelain vessel, and melt together by the heat of a water-bath. Ibid.

*Mercurial Soap.*—Dissolve 1 part of corrosive chloride of mercury in 8 parts of perfumed alcohol, and with this solution beat 32 parts of finely powdered Castile soap into a uniform mass, using a porcelain or Wedgwood mortar. Ibid.

*Tar Soap*.—Take 1 part of wood tar, 2 parts of Castile soap, in shavings, and 2 parts of solution of potassa; beat them together until they unite. Ibid.

*Turpentine Soap* (Starkey's Soap).—Take equal parts of carbonate of potassium, oil of turpentine, and Venice turpentine; triturate them together, in a warm mortar with a little water, until they combine. Ibid.

#### SUPPOSITORIA.

*Suppositories*.—Mr. George W. Kennedy, in reply to the query, "What are the advantages of making suppositories by moulding over the method of making them by hand?" answers, that he knows of none; but that, on the contrary, there are advantages by the hand-making process over the moulded. Apart from the circumstance that no special apparatus is needed, the suppositories can be made more rapidly, more uniform in their composition, and of any desired size or shape that the prescriber may require. See Proceedings, 1874.

In reply to the very animated discussion, pro and con, which followed the reading of the author's paper, the author, in *American Journal of Pharmacy*, February, 1875, p. 55, details the manipulation pursued by him in making suppositories by hand. Cacao butter, which is easily obtained, of good quality, is the best excipient. The cacao butter is first broken up into small fragments, the medicinal ingredient is then added, and rubbed together until a plastic mass is formed, which is rolled out to suitable length, divided so as to obtain the necessary number of suppositories, which are shaped by the aid of the fingers and a spatula. A little lycopodium is used to prevent the mass from becoming too soft by the heat of the hand. In winter, the addition of one drop of glycerin for each suppository, facilitates the manipulation.

Mr. Richard V. Mattison contends that suppositories, made by moulding, answer the purpose more perfectly and more satisfactorily than do those made by any other process. By the author's recommendation, the pharmacist requires a mould; he also requires ice, and the author admits, he must very

strictly execute certain particular manipulations in order to insure uniform good results.

In a paper, immediately following that of Mr. Mattison, Mr. J. Kemble expresses himself very strongly in favor of the process of making suppositories by hand, and advises the use of elm powder, in place of lycopodium, for rolling out the suppositories. A. J. Ph., March, 1875, pp. 98–102.

Alexander Ellis is very much opposed to making suppositories by hand, such process being “a very *dirty* and impracticable one, especially to any one who suffers from hot hands.” He has devised a method by which he readily turns out suppositories, pessaries, or bougies cleanly and expeditiously, at any moment’s notice, without the aid of a metal mould or soiling the fingers. He uses paper cones, made of ordinary stiff, glazed paper, and gives directions for making these and the suppositories, etc., which will be found in Ph. Jour. Trans., April 24th, 1875, p. 345.

*Suppositories of Chloral.*—Dr. Const. Paul recommends these in cancer of the uterus. They are made by mixing 11 grams of cacao butter, 7 grams of white wax, and 6 grams of chloral hydrate; to be divided into six suppositories. A. J. Ph., September, 1874, p. 416; from J. de Ph. et de Chim., August, 1874.

#### SYRUP.

*Dried Syrups.*—Enders has prepared dried syrup of marsh-mallow and syrup of red poppy in the manner suggested by him for syrup of almonds (see fol. 88, Proceedings, 1874). The freshly-prepared syrup is evaporated to dryness on a water-bath, the dry residue is powdered and preserved in well-closed vessels. When dissolved in four-fifths of its weight of water it furnishes the officinal (German Pharmacopœia) syrup to perfection. Arch. Pharm., February, 1875, p. 136.

*Syrup of Gum Arabic.*—C. B. Mann suggests the introduction of a little glycerin into the syrup, and a modification of the officinal formula as follows: Take of gum arabic, 2 troy ounces; glycerin, 1 fluid ounce; water, 7 fluid ounces; sugar,

13 troy ounces. Mix the glycerin and water; dissolve the gum in the mixture, strain, and dissolve the sugar by gentle heat, finishing by raising to the boiling-point. If the officinal quantity of sugar is used, along with glycerin, some of the sugar crystallizes out. A. J. Ph., June, 1875, p. 252.

*Syrupus Asafætidæ*.—The following formula is proposed by Mr. J. W. Wood: Dissolve 256 grains of select asafætida in 2 fluid ounces of glycerin by the aid of gentle heat, strain if necessary, add a solution of 15 drops oil of wintergreen, 5 drops oil of cinnamon, and 1 drop oil of bitter almonds, in 3 fluid drachms of alcohol, and with simple syrup bring the mixture to the measure of one pint. A perfectly stable preparation is formed, each fluid drachm of which represents two grains of the gum-resin. A. J. Ph., September, 1874, p. 410.

*Syrup of Azedarach*.—Mr. J. J. Miles suggests its preparation from the fluid extract (prepared according to his formula; see Fluid Extracts), as follows: Take of fluid extract, 4 fluid ounces; syrup of vanilla (?), 8 ounces; simple syrup, sufficient to make a pint. The syrup of vanilla wholly disguises the bitter and disagreeable taste. A. J. Ph., August, 1874, p. 360.

*Syrup of Boldo* (*Peumus boldus*, Molina) is prepared by Verne by infusing 100 grams of boldo leaves in 1000 grams of distilled water for six hours, straining and expressing the infusion, and dissolving in it 950 grams of sugar by the aid of a water-bath. This syrup is very aromatic, and appears to be easy of administration because of its agreeable taste. Ph. Jour. Trans., November 21st, 1874, p. 406.

*Comp. Syrup of Phytolacca*.—Dr. Charles G. Polk recommends the preparation by macerating in a percolator, for two weeks, 4 ounces each of powdered phytolacca decand. and ampelopsis quinq., and 2 ounces of powdered kalmia latif., in a mixture of half a pint of alcohol and half a pint of water; then percolating 12 fluid ounces, and dissolving in the percolate 24 ounces of sugar with heat. Am. Drug. Circ., July, 1874, p. 122.

*Syrup of Rhamnus Frangula*.—If such a preparation is desirable, Mr. Charles Umney suggests its preparation according

to the following formula: 'Take of bruised bark of *Rhamnus frangula*, 3 ounces 287 grains; sugar, 1 pound; water, q s. Boil the bark in successive portions of water until exhausted. Evaporate the decoctions by a water-bath to ten fluid ounces, or a sufficiency, so that the solution shall, when the sugar has been dissolved in it by a gentle heat, finally measure one pint, or weigh one pound ten and a half ounces (sp. gr. 1.320). Ph. Jour. Trans., July 11th, 1874, p. 22.

*Iodized Syrup of Rhubarb* is suggested by C. Husson, and is prepared as follows: Macerate 100 grams of Chinese rhubarb for twenty-four hours in 400 grams of water, strain, wash the residue with 100 grams of water, filter, and collect 400 grams of liquid. Add gradually a concentrated alcoholic solution of iodine containing 5 grams, dissolve in the liquid 800 grams of sugar, and strain. In this preparation the iodine is completely masked, and cannot be driven out by the influence of heat. See Rhubarb, in this report. Ph. J. Trans., May 29th, 1875, p. 950.

*Iodized Syrup of Coffee* is recommended by Dr. Calvo, Sr., and is prepared by dissolving 16 grams of iodide of potassium in 500 grams syrup of coffee. Ch. and Drug., June 15th, 1874, p. 188.

*Syrups containing Phosphoric Acid*.—Silas Daniel proposes a number of formulas for syrups and solutions of various phosphoric acid combinations, which are given briefly as follows:

*Syrup. Ferri Phosph. Co.*—Dissolve 671 grains of sulphate of iron in 3 ounces and 222 grains of acetate of sodium and 600 grains of phosphate of sodium in 8 ounces of warm distilled water. Mix the cooled solution. Collect and wash precipitate on filter. Dissolve 585 grains of chloride of calcium in 1 ounce and 1903 grains of phosphate of sodium in 17 ounces of warm distilled water. Mix the cooled solutions, wash by decantation, and collect on calico. Having properly drained and expressed the two precipitates, dissolve them in 30 fluid drachms of syrupy phosphoric acid, of sp. gr. 1.50, and then dissolve in the solution 40 grains of carbonate of sodium and 60 grains of carbonate of potassium, both of them pre-

viously rubbed down with a little distilled water. A syrup of cochineal is then made by heating a mixture of 120 grains cochineal, 24 ounces of sugar, and 13 ounces of distilled water to the boiling-point. The syrup is strained, flavored with 1 ounce of orange-flower water, and the filtered solution of phosphates and sufficient water to make 36 fluid ounces are added. The sp. gr. of this syrup is 1.308.

From the above formula the manipulation in the following formulas will be readily understood, and the quantities and kinds of materials are, therefore, only given :

*Liq. Ferri Phosphatis.*—Sulphate of iron, 224 grains ; phosphate of sodium, 200 grains ; acetate of sodium, 74 grains ; phosphoric acid, sp. gr. 1.50, 7 fluid drachms ; distilled water, sufficient to make 2 fluid ounces.

*Liq. Ferri et Mangan. Phosph.*—Sulphate of iron, 168 grains ; sulphate of manganese, 113 grains ; phosphate of sodium, 247 grains (150 grains of which for the iron salt) ; acetate of sodium, 93 grains (56 grains of which for the iron salt) ; glacial phosphoric acid, 6 drachms ; water, sufficient to make 2 fluid ounces of solution.

*Liq. Ferri et Calcis Phosph.*—Sulphate of iron, 224 grains ; chloride of calcium, 156 grains ; phosphate of sodium, 708 grains (200 grains of which for the iron salt) ; acetate of sodium, 74 grains ; phosphoric acid, sp. gr. 1.5, 8 fluid drachms ; water, sufficient to make 2 fluid ounces.

*Liq. Ferri et Strychniæ Phosph.*—Sulphate of iron, 448 grains ; phosphate of sodium, 400 grains ; acetate of sodium, 148 grains ; phosphoric acid, sp. gr. 1.5, 10 fluid drachms ; strychnia, 3 grains ; water, to make 2 fluid ounces.

*Liq. Ferri et Quiniæ Phosphat.*—Made of the same strength as the above, using, however, only 9 fluid drachms of phosphoric acid, and substituting 96 grains of phosphate of quinia for the strychnia.

*Liq. Ferri et Quiniæ et Strychniæ Phosph.*—As this does not keep well, it is made by dissolving 6 grains of phosphate of quinia in each fluid drachm of liq. ferri et strychniæ phosphatis.

*Liq. Manganesii Phosph.*—Sulphate of manganese, 226



grains; phosphate of sodium, 194 grains; acetate of sodium, 74 grains; phosphoric acid (1.5) 7 fluid drachms; water, to make 2 fluid ounces.

The above solutions are converted into syrup as wanted by adding 1 fluid drachm to 5 fluid drachms of simple syrup. Proc. Br. Ph. Conf., 1874, pp. 596-601.

*Syr. Ferri Phosphatis.*—C. R. Blackett, finding that sugar, instead of preventing the coloration and subsequent deposit in solutions of ferrous phosphate, favors such change, recommends that a concentrated solution be made, and of this a sufficiency added to simple syrup as it is required. Such a solution is prepared by the following method: Proceed as ordered in the (British) Pharmacopœia, but take acid. phosph. dil. 5½ ounces, and evaporate to 2 ounces (in a platinum dish, if available), then add the well-washed ferrous phosphate, just as it remains upon the filter without pressing, add water (distilled) to make up to 2 fluid ounces and 5 drachms, dissolve and filter. 3j ℥xxij added to one fluid ounce of simple syrup corresponds to the syr. ferri phosph., British Pharmacopœia. Ph. Jour. Trans., May 9th, 1874, p. 890.

*Syrup of Phosphate of Iron.*—Mr. Blackett has found that the above method does not apply to the “phosphate of iron, quinia, and strychnia liquor.” The strychnia does not exert any decomposing action, but the quinia does most rapidly cause a decided change of color. He finds it very easy to keep a solution of phosphate of iron and strychnia, and then to add 1 grain of phosphate of quinia for each drachm of syrup required. Ibid., July 4th, 1874, p. 2.

*Syrup of Ferrous Phosphate.*—H. William Jones recommends the preparation of a solution of ferrous phosphate for this syrup by acting upon metallic iron with phosphoric acid direct. The hydrogen generated in the bottle or jar is allowed to escape by a suitable aperture in the cork, and entirely prevents the oxidation of the ferrous phosphate formed. A solution is readily formed, which contains seven times the quantity of ferrous phosphate required by the British Pharmacopœia, and will keep very readily, so that the syrup may be prepared

extemporaneously by mixing simple syrup with a suitable proportion of such solution. The strength of the solution may be best determined by means of the solution of bichromate (of potassium?) British Pharmacopœia, each c.c. of which corresponds to .0358 gram of ferrous orthophosphate. The quantity of acid directed by the British Pharmacopœia is entirely too much, 15 minims of dilute phosphoric acid in the fluid drachm of finished syrup being quite sufficient, and it will keep well with 12 minims. If the process is carefully conducted no phosphate of iron will be lost by precipitation. Ph. Jour. Trans., January 9th, 1875, p. 541.

*Syrup of Phosphate of Iron, Quinia, and Strychnia.*—Alfred Spohr finds that by admitting the presence of the small proportion of sulphuric acid originally combined with the iron and quinia, the preparation is a perfect and stable syrup obtained. Five drachms of crystallized sulphate of iron are dissolved in 14 fluid ounces of dilute phosphoric acid, then 192 grains of sulphate of quinia and 6 grains of crystallized strychnia are dissolved in the solution, which is finally brought to the measure of 24 fluid ounces, by the addition of granulated sugar. When the latter is dissolved the syrup is strained or filtered. Am. Drug. Circ., October, 1874, p. 173.

*Syrup of Bromide of Iron.*—Price suggests the following formula for its preparation: Mix 12 grams of the standard solution of bromide of iron, prepared as proposed by the author (see Liquores in this report), with 620 grams, or half a litre of gum syrup flavored with orange-flower water. A. J. Ph., September, 1874, p. 415; from L'Union Pharm., July, 1874.

M. H. Stiles suggests its preparation of such strength that f3j shall contain 3 grains of bromide of iron, and he prefers simple syrup to syrup of gum. Ph. Jour. Trans., August 20th, 1874, p. 163.

*Syrup of Iodide of Iron.*—Max Tschirner recommends the following method of making syrup of iodide of iron: Test first a small quantity of the iodine for moisture, by heating it upon a watch-glass until fumes of iodine commence to

escape; then cover it with another, exactly fitting watch-glass, and continue the heat until all the iodine is sublimed into the last. The difference in weight gives the amount of water. The full quantity of the iodine, as calculated from the experiment, is then converted into ferrous iodide with French nails or fine iron wire, and sufficient water to make with double the weight of sugar the required volume of syrup. The combination may be effected by the aid of gentle heat, or, if time is allowed, occasional shaking will answer. The syrup is finished by gently heating the filtered solution and the sugar together. The syrup keeps better with this quantity of sugar than with the officinal quantity. The author has examined a number of syrups of iodide of iron, purchased in various San Francisco drug stores, and found them to show a variation of from 10 to 46 grains of iodine to the fluid ounce. *A. J. Ph.*, June, 1875, p. 251.

*Lead in Syrup of Iodide of Iron.*—Attention has at various times been drawn to the presence of lead in syrup of iodide of iron; the source of the lead being attributed either to the iron filings or to a crude condition of the iodine. W. A. Shenstone nevertheless found a syrup prepared with pure materials to contain lead, and traced this to the use of an enamelled vessel, in which the iodide had been formed, and subjected to a rather higher temperature than was intended. Various methods have been proposed for the removal of lead from syrup contaminated with it. That proposed by Williams seems to be the best adapted, but the author objects to the dilution of the syrup. He favors the passage of HS through the hot undiluted syrup; removal of sulphide of lead by subsidence; chasing out excess of HS by a current of CO<sub>2</sub>, and finally warming the syrup with a few fragments of iron to remove any free HI. He has, however, not tried it practically. *Ph. J. Trans.*, April 3d, 1875, p. 781.

*Syrups of Hypophosphites of Iron, etc.*—Dr. Charles G. Polk gives a number of formulas for various syrupy combinations of the hypophosphites of iron, quinia, strychnia, manganese, etc., of which the composition is given in the following, the details readily suggesting themselves to the operator:

*Syrup of Hypophosphites of Iron, Quinia, and Strychnia.*

R. Ferrous Oxide, . . . . .	820 grains.
Quinia (pure), . . . . .	64 "
Strychnia, . . . . .	2 "
Sugar, . . . . .	5 ounces.
Hypophosph. Acid (50 p. c. terhydrated), .	10 fluid drachms.
Orange-flower Water, sufficient to make .	8 fluid ounces.

*Syrup of Ferric Hypophosphite with Quinia and Strychnia.*

R. Sodii Hypophosph., . . . . .	256 grains.
Sol. Ferri Tersulphatis, . . . . .	q. s.
Quiniæ Puræ, . . . . .	48 grains.
Strychniæ, . . . . .	1 grain.
Acid. Hypophosph. (50 p. c. terhydrated), .	12 fluid drachms.
Syrup q. s. ad . . . . .	12 fluid ounces.

*Syrup of Ferrous Hypophosphite with Manganese, Quinia, and Strychnia.*

R. Ferrous Oxide, . . . . .	192 grains.
Carb. of Manganese, . . . . .	96 "
Quinia, . . . . .	64 "
Strychnia, . . . . .	2 "
Hypophosph. Acid. (50 p. c. terhydrated), .	12 fluid drachms.
White Sugar, . . . . .	5 ounces.
Orange-flower Water, q. s. ad . . . . .	8 fluid ounces.

*Syrup of Ferrous Hypophosphite Compound.*

R. Fresh Ferrous Phosphate, . . . . .	4 drachms.
Hypophosphite of Manganese, . . . . .	1 drachm.
Quinia, . . . . .	1½ drachms.
Strychnia, . . . . .	1½ grains.
Hypophosph. Acid (50 p. c. terhydrated), .	10 fluid drachms.
Syrup of Orange flower, q. s. ad . . . . .	8 fluid ounces.

*Compound Syrup of the Hypophosphites of Iron, Manganese, Quinia, Strychnia, and Ammonia.*

R. Fresh Phosphate of Iron, . . . . .	1 ounce.
" Hypophosph. of Manganese, . . . . .	½ "
Hypophosphite of Ammonium, . . . . .	1 "
Quinia, . . . . .	64 grains.
Strychnia, . . . . .	2 "
Hypophosph. Acid (50 p. c. terhydrated), .	8 fluid ounces.
Oil of Orange-peel, . . . . .	16 drops.
Syrup of Orange-peel to make . . . . .	16 fluid ounces.

Am. Dr. Circ., January, 1875, p. 28.

*Syrup of Hypophosphite of Iron.*—P. Carles proposes the following formula: 15 grams of ferrous sulphate is dissolved in 20 grams, and 9.14 grams of crystallized hypophosphite of calcium in 330 grams of hot distilled water; the mixed solutions are forcibly agitated, after fifteen minutes the magma is thrown upon a linen strainer, expressed, the liquid filtered through paper, and enough water added to make the weight of the filtrate 360 grams, in which 660 grams of sugar is dissolved by the aid of a moderate heat. The syrup should be kept in bottles, well filled; contains 0.25 grams of the ferrous hypophosphite in each tablespoonful, and has a very pleasant taste if it is mixed with an equal quantity of syrup of orange-flower water. A. J. Ph., Sept. 1874, p. 415; from L'Union Pharm., July, 1874.

#### TINCTURÆ.

*Compound Tincture of Gentian* should be made, according to E. Baker, both by maceration and percolation; the powdered ingredients are macerated for seven days with seven-eighths the quantity of menstruum, with occasional agitation; the mixture is then transferred to a percolator, and when the liquid has disappeared from the surface, and after pressing the solids in the percolator firmly, sufficient additional menstruum is poured on, to make the required quantity of tincture. The Pharm., June, 1875, p. 165.

*Tincture of Boldo* (*Peumus boldus*, Molina) is prepared by Verne by macerating 100 grams of boldo leaves, for eight days, in 500 grams of alcohol of 60 per cent., stirring occasionally during that time, and filtering. The product is deep red, with a slightly green tinge. Ph. Jour. Trans., November 21st, 1874, p. 406.

*Tinct. Cocæ.*—If desirable, such a preparation of coca leaves may be best prepared, according to E. B. Shuttleworth, by percolating 4 ounces of the leaves with sufficient proof spirit or diluted alcohol to make 1 imperial pint of tincture. The author considers that the large quantity of alcohol which each dose would contain might entail therapeutic complications which it would be well to avoid, and suggests that the infusion (see this) will be found as simple and reliable as any

form. The latter might be preserved from change for a reasonable length of time, by the addition of about one-eighth part of alcohol. Ph. Jour. Trans., Dec. 19th, 1874, p. 484.

*Tinctura Quiniæ Ammoniata, B. P.*—According to J. F. Brown there is no necessity for employing heat in the preparation of this tincture, as directed in the Appendix. If the quinia be diffused through half the given quantity of proof spirit, and then the solution of ammonia, previously diluted with the remainder of the spirit, added, and the whole well shaken, a clear solution will be immediately obtained. Ph. Jour. Trans., October 10th, 1874, p. 281.

*Tinctura Quiniæ Ammoniata.*—Mr. Joseph Ince proposes that spirit of ammonia be substituted for liquor ammonia in the formula that originated with Mr. Bastick in 1853. The formula as amended reads as follows: R. Quiniæ disulphatis, gr. xxxij; spirit. tenuioris, ℥iijss.; spirit. ammoniæ, ℥ss. M. So made the solution does not change on keeping. Ph. Jour. Trans., June 13th, 1874.

*Extract of Vanilla.*—Dr. H. T. Bond states, that if the beans are cut up fine and macerated for five days with one-half the quantity of alcohol to be used, and then filtered, the beans on the filter will be found completely dehydrated and deprived of their tenacious qualities. They can then be readily rubbed to a fine powder, ready for percolation with the remaining glycerin, alcohol, and water necessary. The hint is valuable, as it does away with sugar, sand, and all other powdering devices. The Pharm., November, 1873, p. 332.

*Tincture of Deer Tongue.*—Dr. A. W. Miller recommends a tincture, prepared by percolating 2 ounces of ground deer tongue with cologne spirits until 1 pint of tincture is obtained. The tincture so obtained is of a light green color, and can be readily employed for colognes, toilet waters, etc. It also serves as a substitute for the tincture of the fresh leaves of *Asperula odorata*, which, under the name of essence of May wine, is extensively used in Germany for converting wine into the so-called May drink (*Maitrank*). A. J. Ph., March, 1875, p. 117.

*Tinct. Cupri Acet. Rademacheri.*—R. Rother recommends the following modification of Rademacher's method of preparing this tincture: Take of crystallized sulphate of copper,  $2\frac{1}{2}$  ounces; acetate of lead,  $3\frac{1}{2}$  ounces; water, alcohol, of each sufficient. Pulverize the salts, and dissolve them separately, the first in 11, and the other in 5 fluid ounces of water; mix the solutions, and, after a short repose, filter, pouring water through the filter until the filtrate measures one pint; to this add 1 pint of alcohol, and filter from any precipitate which may form during the course of a day or two. Pharm. Gaz., March 31st, 1875, p. 97.

*Tr. Ferri Acetatis* (B. P.).—According to the British Pharmacopœia, this tincture is prepared by double decomposition between an alcoholic solution of  $2\frac{1}{2}$  fluid ounces of solution of persulphate of iron (in 10 fluid ounces of rectified spirit), and 2 ounces of acetate of potassium (in 8 fluid ounces of rectified spirit). The precipitate of sulphate of potassium is filtered off, and the tincture brought to the measure of 1 pint (imp. meas.). The instability of this preparation has induced Mr. G. Welborn to undertake a series of experiments, by which he finds that the trouble is owing to the alkalinity of the acetate of potassium employed. The excess of alkali in the acetate produces a portion of hydrated peroxide of iron, which is held in solution partly by a little nitric acid, which the author finds the solution of persulphate of iron to contain, and partly by the tincture. Upon standing, a portion of the alcohol becomes etherified, at the expense of free nitric acid (?) and acetic acid, and the tincture is then no longer capable of holding the hydrate in solution. The author's view is supported by the fact, that a tincture made from persulphate of iron, free from nitric acid, and acetate of potassium, slightly acidified with acetic acid, has kept unchanged for eighty-five days; while the tincture made strictly according to the Pharmacopœia begins to change after two or three weeks' standing, and very soon after becomes quite unfit for use. Ph. Jour. Trans., September 26th, 1874, p. 241.

*Tr. Ferri Acet. Rademacheri.*—Rother proposes the following improved formula: Take of ferrous sulphate, 2 troy ounces



7 drachms; plumbic acetate, 3 troy ounces; citric acid, 1 troy ounce; strong alcohol, 12 fluid ounces; acetic ether, 2 fluid drachms; potassium chlorate cryst., 1 drachm; water, q. s. Pulverize the ferrous sulphate and plumbic acetate, and dissolve them separately, each in 8 fluid ounces of water, and mix the solutions. Pour the mixture upon a filter, and when the liquid ceases to pass, pour water through the filter until the whole filtrate measures 20 fluid ounces; to this add the alcohol and potassium chlorate; let stand twenty-four hours, shaking at intervals, then filter, and add the acetic ether. *Ph. Gazette*, April 28th, 1875, p. 182.

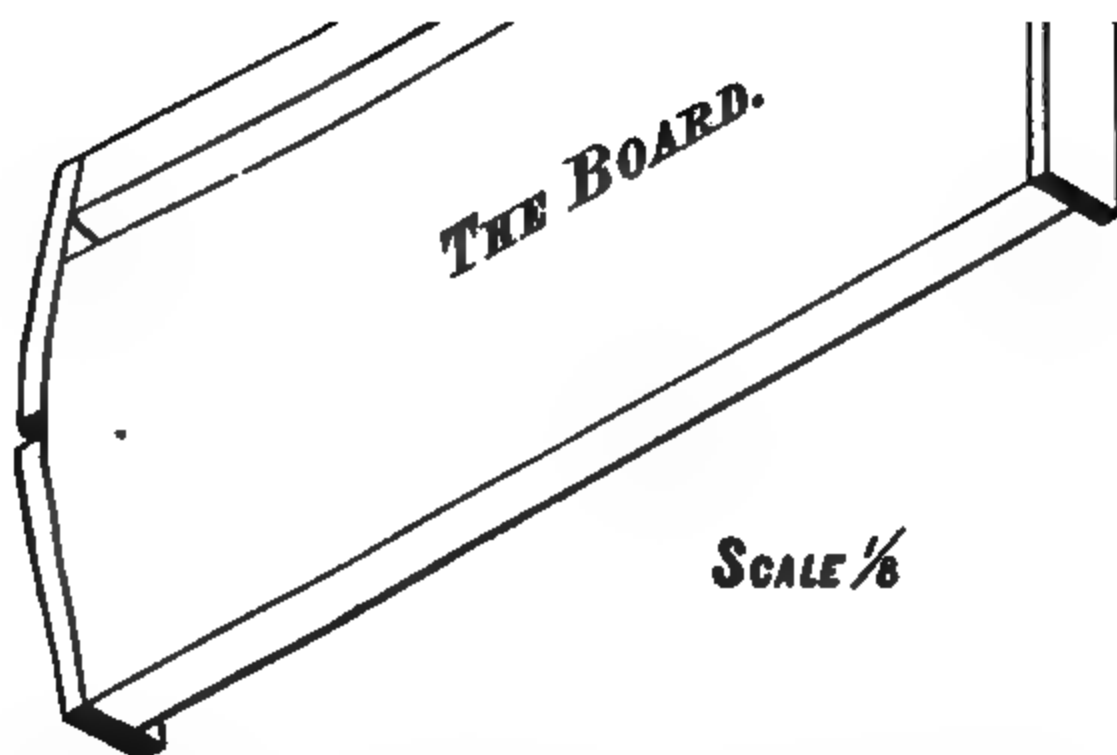
*Tincture of Phosphorus*.—R. W. Condrey proposes that a tincture of phosphorus be prepared as follows: Take of phosphorus, scraped clean, one stick; commercial alcohol (sp. gr., 0.820), thirty-two fluid ounces. Allow to remain in contact a week at least (before using), at medium temperature, and decant as needed. Keep in the dark or in dark-colored bottles. The author finds that a tincture so prepared contains nearly a grain of phosphorus. (See Phosphorus, in this report.) By exposure to the air the phosphorus becomes oxidized, and the oxidation is facilitated by the influence of light. Hence the author recommends that an excess of phosphorus be retained in the containing vessel, and that the vessel be kept in a dark place. According to the age or exposure of the tincture, it will contain more or less free phosphoric acid, but the amount of phosphorus (if present in excess) will be constant. *The Pharm.*, April, 1875, p. 97.

#### TROCHISCI, ETC.

*Wistar's Lozenges*.—Mr. Franklin C. Hill gives the following practical hints on the preparation of Wistar's and liquorice lozenges. The quantity of water necessary to mix the mass varies with the quality of the gum used, the best gum taking the most water. The tendency of the mass to take an elastic condition is owing to the gum getting wet. If the gum can be kept dry until the lozenges are rolled, the mass is easily worked, and then the absorption of the water by the gum hardens the lozenges at once, and prevents their flatten-



ing. Therefore make the water thick, by dissolving the sugar in it, so that the gum gets wet slowly. A syrup of seventeen pounds of sugar to the gallon of water, used before it has become cold enough to deposit sugar, is the best, and if all



the sugar cannot be added in this way, the rest should be added in fine powder. The machine for making the lozenges was introduced by the author in 1856, and is illustrated by the accompanying woodcut (Fig. 28). The best material is

black walnut for the machine, and pine or poplar for the drying-board. The latter should be just large enough to slide under "the board;" is provided with notches at the ends, and is held in its place by springs, which permit it to be pushed notch by notch in one direction, but prevent its return in another. Corresponding to the notches at the ends, are shallow grooves on the surface of the drying-board, about three-eighths of an inch wide and one-sixteenth deep, for the reception of the rolled-out lozenge mass. The "board" is provided with cleats at the sides, for guidance to the size of the lozenges, and with a guard at the back. The "roller" is provided with knives made of sheet brass, let into saw kerfs cut across the wood at regular intervals, and the upper edges are made smooth and true. It is convenient to have another cutter, with knives placed about two inches apart, and standing one-half inch high (for the purpose of dividing the mass into suitable pieces to be rolled out?). The whole machine, when new, is well oiled with olive oil.

Having mixed a mass of about one pound weight, roll it quickly with the second roller, and cut it into the right number of pieces. Then roll each piece to the full length of the board within the end cleats, mark with the knife deeply, but take care not to cut it through, and with the same motion carry it forward until it falls down behind the guard, and rests in one of the grooves of the dryer. With the fingers push the dryer forward one notch, and repeat. When the lozenges are dry, shake them off, and they will snap at the marked places without any trouble. Two to four pounds of lozenges may be made in an hour by expert operators. Atmospheric influence may prevent the lozenges from drying properly, and thus cause them to assume a more or less flat shape, but ordinarily they will dry in a few hours, and retain their shape. A. J. Ph., September, 1874, p. 401.

*Coffee Tablets* are proposed by Dr. Doyen for preparing rapidly a very superior cup of coffee. By the ordinary method of preparing this beverage, a considerable percentage of nutritious matter fails to be extracted; whereas, by the author's method, the entire coffee—the insoluble constituents in form

of an impalpable powder—is used. The following is the method of preparing the tablets: The roasted coffee is subjected to the action of a powerful mill, which operates slowly, to avoid an elevation of temperature, by which some of the volatile matter would be lost; in this manner the berry is reduced to an impalpable powder. The powder is then slightly moistened, mixed with twice its weight of powdered sugar, and pressed into cakes resembling those of chocolate, which are slowly dried, and wrapped in tinfoil to prevent deterioration. The cakes represent five tablets, each weighing thirty grams, one of which, thrown into a cup of boiling-water, readily dissolves, and, leaving but a small residue, furnishes an excellent cup of coffee. The application of coffee in the condition described, for army purposes, is obvious. *The Laboratory*, December, 1874, p. 41.

*Troches of Bromide of Iron* are suggested by Mr. Prince, and are prepared as follows: 18 grams of the standard solution of bromide of iron, proposed by the author (see *Liquores*, in this report), is evaporated to one-half, and is intimately incorporated with a mixture of 1.5 grams powdered tragacanth, and 100.5 grams of sugar, the mass to be divided into 120 troches. *A. J. Ph.*, September, 1874, p. 415; from *L'Union Pharm.*, July, 1874.

*Medicated Gelatin.*—Limousin describes an apparatus constructed by him for the exact preparation of medicated gelatin. It consists of a rectangular mould, which is divided by grooves into sixty parts, each being ten millimetres square. Upon this mould is fitted a cover similarly divided, but having the sides of the squares elevated. These plates are made of copper, plated with silver. In the frame, surrounding the mould, metallic strips are inserted, for the purpose of insuring a uniform thickness of the gelatin sheets. After the solution of gelatin in water has been effected by the heat of a water-bath, the exact weight of a gelatin sheet is ascertained as follows: The mould is slightly warmed, sufficient gelatin solution is poured upon it, the cover is put on, and the apparatus then subjected to some pressure. In a few moments the gelatin will have solidified, the sheet is removed from

the mould, and trimmed with exactness. Its weight is then ascertained, and from this, and the ascertained weight of the whole gelatin solution, the amount of the medicament is readily calculated, which is necessary to obtain squares, so as to represent exactly any desired weight of the medicament. A. J. Ph., June, 1875, p. 266; from Rep. de Pharm., March, 1875.

#### VINA MEDICATA.

*Wine of Boldo* (*Peumus boldus*, Molina) is prepared by Verne by macerating 30 grams of boldo leaves, during twenty-four hours, in 60 grams of alcohol of 60°, adding 1000 grams of Madeira wine, macerating again for eight days, expressing and filtering. The wine possesses in a high degree the aromatic properties of the plant. Ph. Jour. Trans., Nov. 21st, 1874, p. 406.

*Wine of Cinchona* (Codex?).—The usual method is, according to Le Beuf, defective, only about one-fifth of the alkaloids contained being extracted. To overcome this fault the author proposes the following manipulation: The coarsely powdered cinchona bark is macerated for twenty-four hours with the prescribed quantity of alcohol. Then the one-fifth part of the wine necessary is poured on—with cinchona regia but the one-sixth part—and the maceration is continued for five to six days. In this manner the bark is macerated in a much stronger alcoholic menstruum than when the entire quantity of wine is added at once. The remainder of the wine is then added, the maceration is continued a day or two longer, and the liquid is then expressed and filtered. It is suggested, as a still better method, instead of macerating with the remainder of the wine, to subject the bark, after the first macerations, to displacement with the remainder of the wine. Schweiz. Wochenschr., Aug. 28th, 1874, p. 289.

*Wine of Tar*.—J. B. Moore suggests the following method of its preparation: 8 fluid ounces each of glycerin, cherry wine, and honey, and 1 fluid ounce of acetic acid, are mixed with 4 pints of boiling water, in a strong jug or other suit-

able vessel of the capacity of 1 gallon; 8 fluid ounces of pure tar is then added, and the mixture is shaken vigorously for several minutes. The vessel is then tightly stopped and placed on a stove or water-bath, resting upon folds of paper, and the mixture digested for an hour or two at a temperature of 150° to 160° F., with frequent agitation. The mixture is then macerated for a few days in a warm place, again agitating occasionally. Finally the mixture is strained through muslin, and the liquid filtered through paper. The result is a preparation strongly impregnated with tar, and is apparently all that is desirable. A. J. Ph., May, 1875, p. 200.

#### MISCELLANEOUS PROCESSES AND FORMULAS.

*Evaporation of Ethereal Solutions.*—Vulpinus states that the spontaneous evaporation of ethereal solutions may be as readily conducted in tall cylindrical vessels as in the shallow capsules usually employed, if a siphon is introduced into the vessel, and kept in position immediately above the evaporating liquid. The short end of the siphon should be of the height of the vessel, while the long end should reach to near the floor. The action of the siphon is started by simple suction for a moment at the long end, and the flow of ether vapor is then so continuous and rapid that if the long end is cooled beneath the summer temperature, the ether collects in drops. The advantage of using deep instead of shallow vessels consists in the exposure of a smaller surface of the often readily oxidizable residue to the air. Arch. Ph., June, 1874, p. 522.

*Fragments of Iron in rinsing bottles* are proposed by Fordos in place of shot. They will answer the purpose just as well, and, although the iron is apt to oxidize, the ferruginous compound does not attach to the sides of the bottle, and is easily removed in washing. When lead shot is used, carbonate of lead is often left on the internal surface of the bottle. Chem. News, July 10th, 1874; from Compt. Rend., May, 1874.

*Use of Litmus-paper.*—C. J. Lawler makes some remarks upon the improper use of litmus-paper, which, in the hands of inexperienced operators, is apt to lead to inaccurate re-

sults, and he draws attention to the following facts, by the attention to which accurate results are obtained:

1. When litmus-paper is wet with distilled water the blue appears more blue, and red acquires a more distinct pink color.

2. Any change occurring in the wet test-paper, though imperceptible when viewed by itself, is easily recognized when compared with a piece of the same red-colored paper to which the test has not been applied.

3. The contrast in color is still plainer if both the tested and untested papers are compared on a bright yellow groundwork.

4. The change is more readily perceptible if the solution is quite warm.

The following is an expeditious method of using litmus-paper in accordance with the preceding facts: Take a bright lemon-colored porcelain plate (if not attainable, a white plate or tile will serve), and on its surface distribute, as evenly as is possible, small squares of blue or red litmus-paper, as the case may be, wet, about three-eighths of an inch apart. Now apply, with a pointed glass rod, a drop of the solution to be tested to one of the squares. If any reaction occurs, though slight, it is at once perceived by contrasting it with the adjacent squares. J. Appld. Chem., April, 1875, p. 52.

*A New Method of Titration.*—F. Jean, taking advantage of the reactions pointed out by F. Weil, has devised a method of titration analogous to that of August Streng, applicable to the determination of nitrates, chlorates, iodates, chlorites, hypochlorites, etc., of lead, manganese, tin, cobalt, nickel, ferrocyanide of potassium, and to the assay of the oxides of manganese, of red lead, salts of tin, plumbers' solder, and of bronzes. This method is based upon the following reactions: If to an acid solution of protochloride of copper is added a body capable of liberating chlorine, or of passing to a lower degree of oxidation, there is formed a quantity of cupric chloride equivalent to the chloridizing or reduced body, a quantity which may be readily determined by a standard solution of stannous chloride. Knowing the quantity of bichloride formed, it is very simple to deduce the amount of

nitrate, chlorate, or peroxide corresponding. Ch. News, April 16th, 1875, p. 173; Compt. Rend., March 8th and 15th, 1875.

*Acidimetical Titration.*—O. Maschke has found a solution of hæmatoxylin (see Coloring Matters, in this report) to serve the purpose of an excellent indicator. The acid is diluted in an ordinary but high beaker glass, a drop of solution of hæmatoxylin is added, and, after heating gently, soda solution is allowed to flow in gradually, with repeated agitation. As soon as the yellow color changes to brownish, one or two drops more of the solution of hæmatoxylin is added, the solution is heated to near boiling, and maintained at this temperature until the end of the process, which is indicated by a purple-red coloration, when more of the soda solution is gradually added. The boiling is necessary on account of the evolution of a little carbonic acid, which may have been absorbed by the soda solution, and is facilitated by the addition of a little pure quartz powder. Arch. Pharm., January, 1875, p. 36.

*Analytical Weighing.*—J. Lawrence Smith maintains that when using from 0.500 to 1.0 gram of material for analysis it is useless to weigh nearer than  $\frac{1}{2}$  milligram. A great deal of time is lost in attempting what is called accuracy of weighing far beyond the limit of error. A little practice will soon enable any one to judge where to place the last  $\frac{1}{2}$  milligram.

In weighing precipitates on the filter, it is the author's practice to employ two filters of the size required, which have been cut to a size together. These filters are placed on the balance and weighted one against the other, the difference in weight being marked with a pencil on the heavier one. The precipitate is collected and washed on one filter, the filtrate and washings being poured through the other. The two filters are then placed in the warm-bath to dry, and when weighing the one is used to compensate the other on the scale-pans, due allowance being made for the original difference in weight.

When taking the tare of platinum vessels, it should not be taken too soon after wiping them, since a certain amount of air condenses on their surface, and is removed during the wiping, as proved by the author's experiments. Upon stand-

ing for fifteen to twenty minutes after wiping, the original weight is again assumed by the capsule. This change has been usually attributed to moisture, but the author has clearly established that this is not the case. *Ch. News*, February 5th, 1875, p. 55.

*Normal Weights and Measures.*—A commission has been engaged to determine the most suitable alloy for a set of normal weights and measures of the metrical system. For this purpose the commission has selected an alloy composed of 1 part of iridium and 9 parts of platinum; such alloy being exceedingly hard, as flexible as steel, more difficult to melt than platinum, unchangeable, and therefore possessing all the requisites for a standard of such importance. The difficulty of obtaining the enormous quantity of iridium necessary for these standards (25 kilograms) has been overcome by Deville and Debray, who have prepared it by a method which will be found described under Iridium in this report. The two metals were alloyed in a crucible, made from blocks of limestone, by the oxyhydrogen flame. *Ph. Centralhalle*, No. 50, 1874, p. 409.

*Rules and Examples Relating to Weights, Measures, and Specific Gravity.*—Professor P. W. Bedford has compiled such rules for the use of the students of the College of Pharmacy of the City of New York, which will be found very useful in the laboratory, and are reprinted in "*The Pharmacist*," June, 1875. In the same number, Dr. W. H. Pile has communicated some *Rules for Preparing Alcohol of Different Percentages*, which will likewise be found exceedingly convenient.

*A New Thermometric Scale* is proposed by Mr. John Williams, in a paper read at a recent meeting of the Chemical Society (London). After specifying the several defects of the scales now in common use, he proceeded to describe the new one which he had devised. This is based upon the physical characters of mercury, which solidifies at a very low temperature and boils at a very high temperature. Mr. Williams therefore takes the interval between these two points and divides it into one thousand degrees, making his zero the solidifying point of mercury. According to this scale the melting-point



of ice is  $100^{\circ}$ , and the boiling-point of water  $350^{\circ}$ . The advantages of the new scale remain to be practically determined. Among those to be derived from such a scale may be mentioned the avoidance of fractions of degrees, since these are very much smaller than those of either Centigrade or Fahrenheit. Ph. J. Trans., May 8th, 1875, p. 890.

*Sulphide of Carbon and Nitric Oxide Flame.*—B. Delachanal and A. Mermet have devised a lamp for the combustion of bisulphide of carbon in nitric oxide, by which an exceedingly brilliant flame is obtained, sufficiently intense for use in photography. The tint of the flame is violet-blue, and is of such intensity that it causes the detonation of a chlorine and hydrogen mixture. The authors give a description of the lamp, and of the experiments made with its light, in Comp. Rend., November 9th, 1874. Ch. News, December 11th, 1874, p. 274.

*Olivin Light.*—An intense light is produced when the flame of an alcohol lamp, peculiarly constructed, is blown by a current of oxygen gas upon a cylinder, composed of carbonate of calcium, magnesia, and olivin (chrysolith). The cylinder is prepared by exposing the mixed powders of the respective substances to hydraulic pressure. The light produced is very intense, and optically as well as chemically active, but possesses at the same time the mildness of diffuse daylight. The power of this light is not surpassed by that from any source, except that of the sun, according to Stein, who seems to have first drawn attention to it. The simplicity and cheapness of the production of this light render it very applicable to photographing by night, lecture experiments, illuminations, etc. Ch. Centralbl., No. 41, 1874, p. 641.

*Polishing-Cloths for Brass*, as exhibited at the Vienna Exposition, have been examined by Reichardt, who finds that they are prepared by soaking loosely-woven cloths in a solution of silicate of sodium for a time, and then washing them in water. A quantity of silica is retained by the cloth, and imparts to it the property of polishing metallic substances. Arch. Ph., May, 1874, p. 444.

*Silvering Powder.*—A writer in Polyt. Notizbl. gives the

following formula for a silvering powder, which serves the purpose of silvering metallic utensils economically and rapidly: Chloride of silver 3.0; finely pulverized cream of tartar, 20.0; finely pulverized common salt, 15.0. The powder is applied with a woollen rag, or, what is better, it is formed into a thin paste, painted on the metallic object by means of a brush, allowed to dry, and then rubbed off with chalk and a soft rag. By means of this powder, plated ware may be kept in excellent condition at a very trifling cost. Ph. Centralhalle, No. 4, 1875, p. 28.

*A New Paste*, of excellent quality, is obtained, according to J. J. Hess, by coagulating milk by the addition of acetic acid, washing the coagulated casein with distilled water, and dissolving it in a cold saturated solution of borax. A clear, thick liquid is obtained, which possesses strong adhesive qualities. Ph. Centralhalle, June 18th, 1874, p. 199.

*A Cement*, for uniting caoutchouc with metals is made by digesting, at the ordinary temperature, pulverized shellac with 10 parts, by weight, of strong solution of ammonia, for three to four weeks. A perfectly transparent mass is formed, which, when applied as a luting or cement of joints of caoutchouc and metals, softens the caoutchouc, and, after the evaporation of the ammonia, forms a joint, which is perfectly impermeable to steam or other gases, or liquids. Ph. Centralhalle, No. 46, 1874, p. 383.

*Cements for Marble*.—The following receipts are given in the Am. Drug. Circ., October, 1874, p. 181, and may be useful to dispensers of soda-water, etc.:

1. Melt together 8 parts of resin and 1 part of wax; when melted, stir in 4 or 5 parts of plaster of Paris. The pieces to be joined should be made hot.

2. Procure a small piece of quicklime, fresh from a newly burnt kiln, slake with white of egg, wash the fractured parts quite clean, and apply.

3. Soak plaster of Paris in a saturated solution of alum, bake it in an oven, reduce it to powder, mix with water, and apply. It sets like granite.

*Koumiss*.—The original way of preparing koumiss (in leather bags) is very dirty and uninviting. In Russia (Saratow), the following method is used, according to Haurowitz: The ferment is made by mixing two teacupfuls of wheat-flour dough, two teaspoonfuls of millet-flour, one spoonful of honey, one of good beer-yeast, and sufficient milk to form a not too thin paste, which is put into a moderately warm place to ferment. The ferment is now put into a linen bag, and hung in a jar or keg containing sixteen pounds of fresh mare's milk, covered and allowed to stand till the milk has acquired a pleasant acidulous taste (about sixteen to twenty-four hours, according to temperature). The butter and cheese particles, which float about, are now skimmed, the liquid is poured into another keg and shaken for an hour, after which time it is filled into bottles, corked, and put into the cellar. A. J. Ph., June, 1875, p. 261; from Danish sources.

*Kumys*.—Wilckens gives his experience in the preparation of kumys, and recommends the following method: A clean champagne bottle, being provided with a good cork, is filled with good, fresh cow's milk to the neck, sugar is added in the proportion of 30 grams to the litre, and then a piece of compressed yeast (or, in its absence, ordinary beer-yeast) of the size of two peas, which has been previously softened with a little sugar strewn over it. The cork is then securely inserted and tied over with strong twine. The bottle is frequently shaken during the first two days, being, during that time kept in a warm room; after that it is kept in a cellar, but must be occasionally shaken. In five days after commencing the process, the kumys is fit for use. The yeast should be fresh, and the bottles should be kept in the cellar in an upright position, to prevent them from breaking. The resulting kumys is strongly effervescent, and, when well prepared, is milk-white, homogeneous, and of the consistence of thin cream. Its taste is pleasant, and feebly sweet and sour. Ph. Centralhalle, July 16th, 1874, p. 237.

*Kumys Extract*, so called, is prepared in Berlin for the purpose of preparing kumys. It was found, by Nessler, to be composed of a solution of bicarbonate of sodium with much

undissolved sugar of milk; the alkaline compound serving the purpose of neutralizing the acid, as the milk-sugar ferments with difficulty in the presence of free acid. The extract is mixed with milk, and the product is to be used after one hour's action; during that period, however, no fermentation occurs. Ph. Centralhalle, May 21st, 1874, p. 165.

*Jalap Biscuits* are recommended by Tambureau, and are prepared as follows: Emulsify 56 grams of resin of jalap with the yolks of 40 eggs, add successively 1000 grams of sugar and flour (?), and 10 grams tincture of vanilla, form a homogeneous paste, incorporate the whites of 20 eggs, previously beaten up, and divide into 144 biscuits (?). Ph. Jour. Trans., June 20th, 1874, p. 1016.

*Non-poisonous Rat Exterminator*.—J. H. Schultz recommends that common slats or reef-sponge, cut into slices and fried in fat, be used as a rat exterminator. The only care necessary in its preparation is to avoid too great a heat, whereby the sponge would become scorched and friable, and would lose its power of absorption, upon which its virtues as an annihilator of rats depend. The Pharmacist, March, 1875, p. 67.

*Toothache Remedy*.—Dr. G. C. Smith recommends the following: Saturated solutions of carbolic acid and of chloral hydrate, paregoric, fluid extract of aconite, of each fʒj; oil of peppermint, fʒss. Use on cotton or sponge, and tightly pack into the cavity. A. J. Ph., May, 1875, p. 225.

*Toothache Drops*.—The Dental Cosmos for November, 1874, publishes the following formulas:

1. R. *Chloroform*, Sydenham's laudanum, āā ʒij; tinct. benzoin, ʒj. M.

2. R. *Creasote*, chloroform, āā ʒij; Sydenham's laudanum, ʒiv; tinct. benzoin, ʒj. M.

3. R. *Oil of Peppermint*, rhigolin, chloroform, āā ʒiij; camphor, ʒij. M.

4. R. *Chloral*, camphor, āā ʒj; morphia, gr. ij; oil of peppermint, ʒij. M. A. J. Ph., February, 1874, p. 83.

*Betton's Dentifrice*.—The following formula is furnished by

**T. S. Wiegand:** Take of powdered cuttle-fish bone, powdered orris-root, of each 4 lbs.; prepared chalk, 1 lb.; musk, 8 grains; oil of rose, oil of lavender (Mitcham's), of each 48 drops; carmine, No. 40, 2 drachms; ammonia water, 5 fluid drachms; water, 6 fluid ounces. Rub the carmine with the ammonia diluted with the water, and with this solution imbue the prepared chalk and powdered cuttle-fish bone. Allow the mixture to become dry, add the orris-root, perfumed with the essential oils, mix, and sift. The author also furnishes the following formula for

*Piesse's Cuttle-fish Powder:* Take of powdered cuttle-fish,  $\frac{1}{2}$  lb.; precip. carb. lime, 1 lb.; powdered orris-root,  $\frac{1}{2}$  lb.; oil of lemon, 1 ounce; oil of neroli,  $\frac{1}{2}$  ounce; carmine,  $\frac{1}{2}$  drachm; ammonia water, 2 fluid drachms; water,  $1\frac{1}{2}$  fluid ounces. Proceed as above. Am. Jour. Ph., Jan. 1875, p. 10.

*Harmless Face Powders.*—According to H. M. Wilder, the apothecaries of Copenhagen (Denmark) have agreed on the two following compositions as substitutes for the numerous, generally poisonous, face powders:

*White.* Oxide of zinc, 30 grams; wheat starch, 250 grams; oil of rose, 3 drops.

*Red.* Carmine, 1 gram; carbonate of magnesium, 4 grams. A. J. Ph., January, 1875, p. 7.

*Perfumes.*—Dr. A. W. Miller recommends deer-tongue as a valuable adjunct in perfumery, and especially for the purpose of making the perfume "New-Mown Hay."

*Extract of New-mown Hay* is prepared by mixing 8 ounces of tincture of deer-tongue (see Tinctures, in this report), 4 ounces of extract of rose from pomade, 4 ounces of extract of orange-flowers from pomade, and 16 drops of oil of rose (Virgin Serail).

*New-mown Hay Sachet Powder:* Take of deer-tongue leaves, 2 ounces; orris-root, Damascene rose petals, and orange-flowers, of each 1 ounce. The ingredients, in coarse powder, are mixed and sifted.

*Sachet Bouquet:* Take of ground deer-tongue leaves, 2 ounces; ground white sandal-wood,  $\frac{1}{2}$  ounce; ground orris-

root, 1 ounce; ground ambretta seeds,  $\frac{1}{2}$  ounce; ground benzoin,  $\frac{1}{2}$  ounce; ground Damascene rose leaves, 1 ounce. Mix, and sift to remove coarse particles. A. J. Ph., March, 1875, p. 117.

*Cologne Water.*—The following formula is given in Ph. Centralhalle, No. 43, 1874: Oil of neroli, 2 parts; oil of rosemary, 1 part; oil of lemon, 3 parts; oil of bergamot, 1 part; and oil of orange, 3 parts. One kilogram of this mixture is dissolved in 60 litres of alcohol (85 to 90 per cent.); the solution is heated to 60° C. (= 140° F.), and subsequently filtered. The heating effects the blending of the perfumes in a short time, which otherwise takes place only after several months.

*Hair-oil Scent (cheap).*—A. E. Ebert recommends the following formula: Take of oil of lavender, oil of rosemary, of each 8 parts; oil of cloves, 2 parts; oil of cassia, 1 part. Mix. Collated Practical Receipts, in The Pharm., April, 1875.

*Chinese or Indian Ink.*—It is stated in Ritfault's treatise on the "Manufacture of Colors," that the following formula will furnish an article which is equal in every respect to the Chinese article: Calcined lampblack, 100 parts; boghead shale-black, in impalpable powder, 50 parts; indigo carmine, in cakes, 10 parts; carmine lake, 5 parts; gum arabic (first quality), 10 parts; purified oxgall, 20 parts; alcoholic extract of musk, 5 parts. The gum is dissolved in 50 to 60 parts of water, and the solution is filtered through a cloth. The indigo carmine, lake, lampblack, and shaleblack are incorporated with this liquor, and the whole ground upon a slab, with a muller, in the same manner as ordinary colors; but in this case the grinding takes much longer. When the parts are thoroughly homogeneous, the oxgall is gradually added, and then the alcoholic extract of musk. It is then allowed to dry in the air, until it has acquired sufficient consistency to be moulded into cakes, which in their turn are still further dried in the air, out of the reach of dust. When quite firm, these cakes are compressed in bronze moulds, having appropriate designs engraved upon them. The moulded ink is then wrapped in tinfoil, with a second envelope of gilt

paper. The Laboratory, December, 1874, p. 42; from Scientific American.

*Invisible Ink.*—Prof. A. Vogel prepares an invisible ink by dissolving a little sugar in sulphuric acid, diluted with ten parts of water. Upon heating the paper which has been written upon with the acid liquid, the characters become black. Ph. Centralhalle, No. 16, 1875, p. 135.

*Indestructible Ink.*—Gaffard, of Paris, prepares such an ink with 15 parts silicate of potassium, 1 part caustic-ammonia solution, 35 parts of water, and 1 part of reburned lampblack. Ph. Centralhalle, No. 16, 1875, p. 135.

*Anilin Inks.*—According to C. H. Viedt, when anilin inks are prepared from the anilin colors which are readily soluble in water, they require neither gum nor dextrin, except for slow and heavy writers. They should be so far diluted that the writing, when dry, is free from the metallic lustre of the anilin colors. The author recommends the following proportions:

*Red Ink.* 1 part diamond-fuchsin to 150–200 parts water.

*Blue Ink.* 1 part bleu de nuit (anilin blue soluble in water) to 200–250 parts water.

*Violet Ink.* 1 part anilin-violet to 300 parts water.

*Green Ink.* 1 part of so-called iodine-green to 100–110 parts water. This is very expensive, of blue-green color; may be obtained of yellow-green by the addition of a little picric acid.

*Yellow Ink.* 1 part picric acid to 120–140 parts water. Anilin does not answer as well, and is dearer. A. J. Ph., February, 1875, p. 64; from Polyt. Jour., October, 1874.

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## MATERIA MEDICA.

### *a. Vegetable Drugs.*

*Indian Medicinal Plants.*—Surgeon B. Evers contributes some interesting notes on Indian medicinal plants, comprising *Michelia Champaca*, the bark of which is used as a febrifuge; *Carica Papaya*, the pawpaw tree, the milky juice of the



unripe fruit of which is used as a vermifuge; *Acorus Calamus*; *Cochlospermum gossypium*, the bark of which is used as a tonic and demulcent for gonorrhœa; *Calosanthus Indica*, the root, bark, leaves, and seeds are used medicinally; *Pongamia glabra*, the dried pericarp of the fruit of which, as well as the legumes, are used for cough and throat affections; *Holarrhena antidysenterica*, the seeds and bark of which are used as remedies in bleeding piles and dysentery; *Jatropha Curcas*, the juice of which seems to be a powerful hæmostatic; and, finally, *Sesamum Indicum*, with which we are familiar. See Ph. Jour. Trans., June 26th, 1875, p. 1028; from Indian Med. Gazette, Feb. and March, 1875.

*Japanese Drugs.*—Ed. Schaer describes a number of drugs, which are exported from Japan and possess pharmaceutic interest, but can only be enumerated in this report. The author's description includes various parts of the following plants: *Rhus semialata*, Murray; *Xanthoxylum piperitum*, D. C.; *Coptis anemonefolia*; *Cinnamomum Lamarkii*; *Gardenia florida*, L.; and *Mentha arvensis*, L. var. *javanica* (*M. javanica*, Bl.). Schweizer. Wochenschr., No. 22, 1875.

*Brazilian Drugs.*—E. M. Holmes gives a description of some Brazilian drugs which were lately presented to the Pharmaceutical Society (of Great Britain) by Messrs. Cyriax and Farries, and were collected in the province of Rio, Southern Brazil. The botanical origins of a number of these drugs have been determined by Mr. Holmes, and some of them are referred to elsewhere in this report. The drugs described are the following:

*Braço do Preguiça* or *Velame*; referred by the author to *Solanum bullatum*, Vell., rather than to *S. jubatum*, Dumal, as supposed by Dr. Barnsley.

*Birtua*; referred to *Chondodendron tomentosum*, R. et P.

*Caroba*; referred to, probably, *Jacaranda paulistana*, D. C., or *J. oxyphylla*, Cham.

*Casca d'Anta*; probably derived from *Drimys granatensis*, Linn.

*Cipó sumá*; referred by Dr. Barnsley to *Anchieta salutaris*, St. Hil., but regarded as doubtful by Mr. Holmes.



*Erva do Rato* ; referred by Dr. Barnsley to *Palicourea Marcgravii*, St. Hil.

*Fruita de Gentio*, probably belongs to the *Cucurbitaceæ*.

*Japicanga* ; referred by Dr. Barnsley to *Smilax glauca*, Mart.

*Jarrinha* ; referred by Dr. Barnsley to *Aristolochia cymbifera*, Gom. (Mart.?)

*Pipi* ; probably belongs to the *Malpighiaceæ*.

*Quina Quassia* ; identified to be derived from *Picrasma Velosii*, Pl.

*Saponacea* ; evidently a species of *Sapindus*, possibly *S. divaricatus*, Willd.

*Tayuyd* ; referred by Dr. Bardsley to *Trianosperma Tayuyd*, Mart., but Holmes considers this doubtful.

*Timbo* ; Dr. Barnsley believes it to be derived from *Physalis heterophylla*, Wels. See Ph. Jour. Trans., May 5th and June 12th, 1875.

*Morocco Drugs*.—The arrival of various specimens of drugs from Morocco, has enabled A. Leared and E. M. Holmes to identify with certainty several which, in a former paper (Ph. Jour. Trans., 3d ser., vol. 3, p. 621), were doubtfully named or not identified at all. The specimens comprise plants, leaves, flowers, seeds, bark, roots, and exudations. Some of these, as described by the investigators, have been embodied in this report. Ph. Jour. Trans., January 2d, 1875, p. 521.

#### ALGÆ.

*Posidonia Oceanica*.—Fausto Sestini has made a chemical analysis of this maritime plant, and finds it to be composed of:

Water, . . . . .	26.15
Fatty matter (extracted with ether), . . . . .	2.55
Albuminoids (calculated on 15.5 per cent. of nitrogen), . . . . .	8.77
Hydrocarbons (cellulose, starch, dextrin), . . . . .	61.26
Ash, . . . . .	6 27
	<hr/>
	100.00

Chem. News, July 24th, 1874 ; from Gaz. Chim. Italiano.

## FUNGI.

*Saccharine Matter contained in Mushrooms.*—A. Muntz had previously shown that mushrooms contain saccharine matter in the form of mannite, of trehalose, or of a species of glucose not yet determined. He has since extended his experiments to the lower fungi which play the part of ferments and moulds. In the true ferments, such as beer-yeast, he has not been able to prove the presence of mannite and trehalose. The moulds, on the other hand, yielded the bodies in question very distinctly.

*Penicillium glaucum*, cultivated in solutions of starch, inverted sugar, tartaric acid, and gelatin, to which the needful mineral elements were added, contained constantly in its tissues a very appreciable quantity of mannite. The production of mannite at the expense of the tartaric acid deserves attention. The constitutions of these two bodies differ widely, and since the molecule of tartaric acid is more simple, and contains less carbon, the *penicillium* effects a true synthesis in a manner accessory to its principal function, which is a complete combustion, the reverse of the synthetic function, which is more characteristic of the plants containing chlorophyll.

*Mucor Mucedo*, cultivated on horse-dung, putrescent kidney-beans, etc., yielded trehalose, but no mannite. In this respect the moulds rank with the higher fungi. The myxomycetes are placed by some authorities between animals and plants, and by others among the fungi; hence it is interesting to examine what sugar they contain. *Ethelium septicum* yielded abundance of trehalose, a fact which tends to connect these plants with the fungi. Ch. News, Dec. 24th, 1874, p. 294; Compt. Rend., Nov. 23d, 1874.

*Polyporus officinalis*, Fries.—E. Masing's experiments prove the resinous constituent of *Boletus laricis*, obtainable by extraction with alcohol of 95 per cent., to be composed of at least four distinct resins. It may be divided into two composite portions, one of which is sparingly soluble in cold alcohol, and is defined by the author as a white resin; the other is readily soluble in alcohol, and is designated as red resin.

The *white resin* is tasteless. By the agency of chloroform it may be divided into two distinct resins, of which one is soluble in 303.8 parts of 95 per cent. alcohol at 14° C. (— 57.2° F.), is insoluble in chloroform, and melts at 125° C. (— 257° F.). The other, which is dissolved by the chloroform, requires 130 parts of 95 per cent. alcohol, and melts at 90° C. (— 194° F.).

The *red resin* is, when purified, excessively bitter, and to this is probably due the bitterness of agaric. It is readily dissolved by 70 per cent. alcohol, and on dilution with water the greater part is precipitated, which is distinct from the portion that remains in solution. The latter portion is soluble in 590 parts of distilled water, and in 58.8 parts of alcohol (95 per cent. ?).

The resinous mixture seems to undergo chemical change by prolonged boiling with milk of lime. By treatment with dilute acids there is no glucose formed ; it yields, among the products of destructive distillation, some umbelliferon, and it is not very readily acted upon by nitric acid, which, however, by the aid of heat forms, among other products, picric and succinic acids. Arch. Pharm., Feb. 1875, pp. 111–125.

*Boletus laricis*.—A sample of agaric, also called white agaric, has, by Prof. J. M. Maisch, been found in the American market, of a physical appearance which induced him to subject it to a closer examination. He found the sample, which consisted of a coarse white powder, intermixed with some larger, irregular white pieces, to be composed mainly of what he considers a species of agaricus, which had been mixed with some powder of the larch-agaric, to impart a bitter taste. The substitution had not the bitter taste which the larch-agaric possesses. A. J. Ph., Jan. 1875, p. 10.

*Agaricus fasciculatus* has been examined by F. S. Harsten. The fungus, after expression and treatment with alcohol to separate water, was macerated with a mixture of alcohol (and ether ?), and the ether removed by distillation. On cooling, the alcoholic solution which remained deposited crystals, which were freed from fat by boiling alcohol, and consisted of *mycosterin* and *mycoraphin*. These may be separated by

means of ether, mycoraphin being more soluble. A further yield of mycosterin was obtained from the exhausted fungus by means of benzene. Both substances are soluble in water, difficultly soluble in cold alcohol. Mycosterin crystallizes in small nodules or spherules, consisting of concentrically grouped needles. Mycoraphin crystallizes in two forms, from alcohol in plates, and from ether in thin needles, which are colored red when treated with concentrated sulphuric acid. The author thinks it possible that Gobley's agaricin is a mixture of these two substances.

*Lactaris deliciosus*.—The author seems to have obtained identical results with this fungus. A. J. Ph., Sept. 1874, p. 426; from Jour. Ch. Society, 1874.

*Monas Prodigiosa*.—Otto Helm has had opportunity to observe and study these curious *bacteria*, which during the middle ages were often mistaken for blood, were consequently regarded with extreme superstition, and led to much persecution. It appears spontaneously upon food, etc., in certain localities, and the author first observed it upon food of various kinds, such as potatoes, meat, and bread, during the summer of 1872, and again about the middle of July, 1874. By carefully cultivating it, he has obtained it in sufficient quantities to make chemical examinations of its peculiar red coloring matter, which resembles anilin-red so closely; and by the aid of the microscope, he has been enabled to observe its growth and to study its form, etc. The characteristics of the coloring matter are described under "Monas-red" in this report. For the details of the author's experiments see Arch. Pharm., January, 1875, pp. 19-24.

#### LICHENES.

*Archil and Cudbear*.—"A Leeds workman," in a communication to the Chem. News (Sept. 18th, 1874), states that in all the works on chemistry there is no real practical information on the manufacture of archil and cudbear, and he offers the following for general information, and to fill the void:

*Archil Liquor* is made by placing 300 pounds of Zanzibar

orchella-weed into a cistern, covering with about 120 gallons of ammonia at 8°, steeping it a day and a night, running off the liquor into covered pans, which are heated with steam pipes underneath, and are in size 6 yards by 4, and 1 foot deep. The lid is removed once a day for about five minutes and the liquor is stirred. In about six weeks it is ready for storing or dyeing with.

*Paste Archil*.—50 pounds of the weed, ground a little, and 100 pounds of ammonia 8° strong, are worked in pans (size, about 4½ feet long, 2½ feet wide, 2 feet deep), which are provided with an iron lid to keep in the ammoniacal gas, and are heated by steam pipes placed underneath. The mass is turned over about twice a day (morning and night) for about eight days, and is then mixed with 5 pounds of sulphuric acid and 50 pounds of common salt; the contents of four pans being usually worked together in a cistern.

*Cudbear*.—The weed is worked up in the same manner primarily, but instead of mixing the contents of the pans with salt and acid, they are dried by means of steam-heat on an iron plate about 10 yards square, and the dried mass is ground to powder.

*Blue Archil* is made by macerating in the cold (at the ordinary temperature?) 100 pounds of weed in 300 pounds of ammonia, 6° strong, and turning the mass over twice a week for about ten weeks.

*Orseille* (Litmus?).—M. Hock has found orseille, of German manufacture, to be largely adulterated with the blue-red melting residues from the preparation of fuchsin. The article contains but a small percentage of orseille, and consistence was given to it by means of starch paste. As this adulterated article contains very considerable quantities of arsenic it is exceedingly dangerous, as orseille is frequently employed for coloring confectionery. Ph. Centralhall., May 7th, 1874.

#### LYCOPODIACEÆ.

*Lycopodium*.—Scriba has met with lycopodium which had been adulterated with talcum, to the amount of 25 per cent. The adulterated article resembled good lycopodium very

closely, and was only somewhat lighter in color. Schweiz. Wochenschr., January 22d, 1875, p. 25.

*Aluminium in certain Cryptogams.*—The absence of aluminium in the ashes of flowering plants, and its occasional presence in cryptogams, has induced Prof. A. H. Church to subject the ashes of a number of cryptogams to chemical examination, his results being presented in the following table:

	Percentage of ash in dry plant.	100 parts of ash contain	
		Silica.	Alumina.
<i>Lycopodium alpinum</i> , . . . . .	8.68	10.24	38.50
<i>L. clavatum</i> , . . . . .	2.80	6.40	15.24
<i>L. Selago</i> , . . . . .	8.20	2.53	7.29
<i>Selaginella Martensii</i> , . . . . .	11.66	41.03	0.28
<i>S. spinulosa</i> , . . . . .	8.44	6.67	none.
<i>Equisetum maximum</i> , . . . . .	20.02	62.95	none.
<i>Ophioglossum vulgatum</i> , . . . . .	8.25	5.82	none.
<i>Psilotum triquetum</i> , . . . . .	5.06	8.77	trace(?)

The author carefully excluded all sources of error arising from the presence of extraneous matter, and employed absolutely pure reagents. He proposes to continue his researches. Chem. News, September 18th, 1874, p. 187.

#### GRAMINACEÆ.

*Egyptian Wheat.*—H. Dworzack has found barium to be a component of the ash of Egyptian wheat. He found also that the stems contained it in smaller proportion than the leaves, and, consequently, it seems to be distributed in a manner similar to lime. Knop had previously found baryta a component of Nile mud, and the author's analysis confirms this. Ch. Centralbl., No. 52, 1874, p. 821.

*Glucose in Wheat and Rye Flour.*—The pre-existence of glucose in wheat and rye has heretofore been a disputed point. De Saussure had obtained from an alcoholic solution of gluten a body which he named mucin, and to which he attributed the property of converting starch into glucose. Bibra believed that glucose existed ready formed in the grain. A. Pöehl has now made some experiments by which he proves that glucose does not pre-exist in grain, but is formed by the influence of

moisture very readily. He had thoroughly dried some grains of rye and wheat, powdered them, and then digested the powders in alcohol of 95 per cent. In neither of the solutions obtained could the presence of glucose be detected. If, however, the grain was powdered in its ordinary (undried) condition, their alcoholic solutions left on evaporation residues which contained glucose, although in very small quantities. The author explains that the small quantity of water enables the mucin (mucedin) to react upon the starch, and thus confirms the view advanced by De Saussure. The author's observation is important also from the fact that it affords a means of determining a previous damp condition of flour. A good article of flour should give but very slight evidence of glucose; if it, however, contains a considerable proportion, it is an evidence of a previous damp condition. Ch. Centralbl., No. 33, 1874, p. 519.

#### PALMACEÆ.

*Areca Catechu, L.*—In view of the proposed introduction of the betel-nut into the British Pharmacopœia, Mr. John L. Jackson submitted the following interesting notes on the tree itself and its uses: The areca palm is a handsome tree, growing to a height of forty to sixty feet. After a description of the tree, which will be found in the usual works on botany, the author goes on to state the uses to which the various products of the tree are put, etc. The tree is cultivated in nearly all the warmer parts of Asia for the sake of the seeds, which are not only chewed in large quantities by the natives in the countries where they grow, but are shipped to countries where the palm is not cultivated. The average annual product of a tree is said to be about three hundred nuts. Although cultivated largely all over India, as well as in China, it is more abundant in Malabar, North Bengal, the lower slopes of the mountains of Nepaul, and the southwest coast of Ceylon.

Many varieties of the betel-nut palm are known to the natives by different local names; the nuts also vary much in size, but their quality depends upon their appearance when



cut through, "intimating the quantity of astringent matter contained in them." If the white or medullary portion which intersects the red or astringent part be small, and has assumed a bluish tinge, and the astringent part is very red, the nut is considered of good quality; but when the medullary portion is in large quantity, the nut is considered more mature, and, not possessing as much astringency, is not esteemed so valuable.

The nuts are gathered between the months of August and November. The seeds are removed from the husk and boiled in water. In the first boiling the water becomes red and thick, and is evaporated into a variety of catechu, which it is uncertain whether it is imported into Great Britain. In Mysore the nuts, as they are taken off the tree, are extracted by boiling with water in an iron kettle, and evaporating the liquid by continual boiling. This process furnishes *kossa*, or most astringent *Terra Japonica*, which is black, but very impure, containing paddy husks and other impurities. From the residual nuts, after the above process and after drying them, the best and cleanest kind of catechu, called *coony*, is obtained by again boiling them with water and inspissating them as before. This product is yellowish-brown, has an earthy fracture, and is free from admixture of foreign bodies.

In Borneo the flowers, which are fragrant, are mixed with medicines for the cure of many diseases. The juice of the young tender leaves, mixed with oil, is applied in some parts of India as an embrocation in cases of lumbago. A decoction of the root is a reputed cure for sore lips. Ph. Jour. Trans., February 28th, 1874.

*Areca Nuts*.—The question having arisen at a meeting of the Pharmaceutical Society of Great Britain respecting the anthelmintic value of the areca nut, and the degree of fineness to which it should be powdered, Mr. Charles Andrews states that in India (in the Bombay Presidency) it is used in a grated state, the grating being done on an ordinary nutmeg grater; and that in his opinion it is much more useful in the grated condition than when in fine powder. The favorite method of administration in India is to give a teaspoonful of the grated



powder floating on milk. It generally acts in about an hour after its administration. Ibid., February 14th, 1874.

*Carnauba Root (Corypha Cerifera).*—Under the name of “carnauba root” two bales of root have been imported into Liverpool. Judging from the remarks accompanying the importation, the root has a high repute in Brazil as a substitute for sarsaparilla; equalling the latter in all its medicinal effects and being one-half cheaper. The *Corypha cerifera*, which furnishes the root, is a wax-bearing palm, growing on the shores of the Rio Francesco, in Brazil. The root is several feet in length, has an average thickness of three-eighths of an inch, gives off here and there small rootlets, and is of a mixed grayish and reddish-brown color. The cortical portion is comparatively thick, somewhat friable, and loosely surrounds the medullium which incloses the pith. Its infusion is similar in color to that of wild-cherry bark, possesses an agreeable, slightly bitter taste, and an odor not unlike that of sarsaparilla. It is not precipitated by liquor potassæ, or by dilute acid, and is not blackened by tinct. ferri chlor., which, however, produces a brownish color, gradually followed by turbidity and eventual precipitation. It contains no starch. It yields 25 per cent. of extract (aqueous?). Ph. Jour. Trans., February, 1875, p. 661.

Some experiments made by E. L. Cleaver prove the presence of an alkaloid in carnauba root, but in such small quantities that it is necessary to work on large quantities for its successful isolation. It also contains an acrid resin, a red coloring-matter, a variety of tannic acid, and, he thinks, a small quantity of volatile oil. He proposes to continue his experiments, and to operate upon larger quantities. Ph. Jour. Trans., June 5th, 1875, p. 966.

#### MELANTHACEÆ.

*Colchicum Autumnale.*—J. Pierre, in a communication to the French Academy, states that having plucked some fully expanded flowers of *Colchicum autumnale* in order to examine them more closely, he was surprised to notice that after a few

seconds his fingers had changed color, and taken the livid greenish-yellow tint characteristic of a corpse in a state of incipient decomposition. After about ten seconds the skin regained its usual color. As the discoloration extended throughout the length of the fingers, and even beyond, the question arose whether or not it was caused by absorption by contact at the extremity of the fingers. The author therefore extended his hand over a large clump of flowers, having anthers two or three centimetres in length, and, carefully avoiding all contact, found that the same effect was produced. Subsequent experiments lead him to the opinion that the peculiar toxic effect of colchicum flower is due to a volatile principle, and that this is most abundant during or approaching the act of fecundation. The author proposes to investigate the nature of this singular substance, which probably plays an important part in the accidents attributed to fresh colchicum compared with the innocuousness of the stale or dried flowers. Ph. Jour. Trans., October 24th, 1874, p. 325 ; Compt. Rend., t. 79.

*The Active Principles of the Officinal Veratrums.*—The very thorough and elaborate investigations of Charles L. Mitchell upon the subject, as detailed in a paper read before this Association at its last annual meeting, requires simple mention here, since it may readily be referred to in the Proceedings, 1874, pp. 397 to 428.

#### ASPARAGINEÆ.

*Flueggea Japonica.*—Richard E. Scheer has had opportunity to examine two tuberous drugs of Japanese origin, which had been exhibited at the Vienna Exposition. The one was labelled "Ophiopogon japonicus," the other "Flueggea japonica." Upon close examination, the two drugs proved to be the root formations of the same plant, differing only in their preparation for the market. From the history of the plant, it appears that it has been described by different authors under various names. Linnæus describes it under the name "Convallaria japonica ;" Desvaux calls it "Slateria japonica." The author gives a very exhaustive description of the roots,

and finds them, medicinally, to be simply demulcent; containing oxalate of calcium, starch, a variety of gum, and levulose. The occurrence of the latter to the exclusion of other sugars is remarkable, as the varieties of sugar usually found in roots, stems and fruits are, when not saccharine, either invert sugar or variable mixtures of right and left deflecting glucose. Although the drug possesses a feeble bitter and astringent taste, the author failed to extract either a bitter principle or tannin. Neither did he find albumen present. The ashes amounted to  $1\frac{1}{2}$  per cent. Arch. Ph., October, 1874, pp. 335–349.

#### SMILACEÆ.

*Sarsaparilla*.—Ed. Marquis has endeavored to determine which of the various sarsaparillas of commerce is the best, basing the quality upon the quantity of smilacin contained in them. He has determined the amount of this substance, the moisture, the alcoholic extract, and the cold aqueous extract after exhaustion with alcohol, the proportion of alcoholic extract soluble in water, the proportion of aqueous extract soluble in alcohol, the mucilage, the ash of the mucilage, the starch, the sugar, and the ash of the roots. The author gives the methods pursued by him; but these are too voluminous to find a place in this report. The following table gives his final results, in explanation of which it may be well to state that the extracts were in each instance dried upon a water-bath, until they no longer lost weight. The experiments were made with fourteen commercial samples of sarsaparilla, a sample of *Smilax aspera*, and one of *Smilax china*:

SARSAPARILLA.	QUANTITIES EXPRESSED IN PERCENTAGE.										
	Moisture.	Alcoholic extract.	Smilacin.	Portion of alcoholic extract soluble in water.	Aqueous extract.	Mucilage.	Ash of mucilage.	Portion of aqueous extract soluble in alcohol.	Starch.	Sugar.	Ash of the root.
Honduras, 1874, I, . . . .	10.39	5.50	0.54	4.96	2.60	2.04	Lost.	0.56	45.00	—	4.74
“ “ II, . . . .	10.80	5.44	0.58	4.86	2.56	2.10	0.42	0.46	45.00	—	4.80
“ 1865, . . . .	10.82	18.88	1.26	12.12	6.98	4.26	0.40	2.27	6.25	—	6.15
Caracas, 1868, I, . . . .	11.33	9.62	1.50	8.12	8.10	2.50	Lost.	0.60	23.68	—	4.23
“ “ II, . . . .	11.20	9.42	1.60	7.82	8.18	2.50	0.20	0.68	23.68	Traces.	4.20
Italica, 1865, . . . .	11.12	8.48	0.86	7.57	8.86	2.70	0.16	0.66	20.27	—	4.10
Lisbonensis, old, . . . .	11.62	9.16	0.86	8.30	4.81	4.80	Lost.	0.51	20.49	—	6.46
“ 1866, . . . .	10.97	8.66	0.86	7.80	5.00	3.46	1.14	1.54	14.84	—	4.35
Jamaicensis, 1865, I, . . . .	11.16	12.34	1.68	11.66	9.74	8.50	Lost.	1.24	4.89	—	8.15
“ “ II, . . . .	11.19	12.22	1.78	10.44	9.82	8.44	1.38	1.38	4.89	—	8.21
Vera Cruz, without rhizome, '74	10.70	9.20	1.42	7.78	7.50	8.08	0.48	4.42	6.92	Traces.	6.80
“ “ “ '65; } not washed, }	9.80	14.80	1.50	13.80	7.10	4.06	0.88	8.04	6.92	—	12.40
“ (a) rhizome, . . . .	8.11	7.84	1.24	6.60	8.20	1.82	0.24	1.38	8.10	—	8.26
“ (b) roots, . . . .	9.80	9.22	1.48	7.74	10.10	8.88	0.52	1.72	9.87	—	6.88
Smilax aspera, . . . .	9.10	18.98	5.12	8.86	8.92	2.14	0.60	1.78	15.00	Traces.	4.80
“ China, . . . .	12.58	8.54	0.68	2.86	8.80	2.28	0.10	1.02	30.00	—	1.59

*Asphodelus Ramosus*, Moench.—A Morocco drug, called “Ab-laluz,” has been recognized by Leared and Holmes to consist of the rootstock and tubercular roots of this plant. The rootstock is about two inches long and three-quarters of an inch in diameter; of a pale-brown color, with numerous fleshy fusiform tubercular roots attached to it of about the thickness of the forefinger. The taste of the root is insipid. It seems to be very tenacious of life, giving off shoots without being moistened, and in dry air. Ph. Jour. Trans., January 2d, 1875, p. 521.

## LILIACEÆ.

*Aloes*.—Dr. William Craig has contributed a very interesting paper upon the “Action of Changed Aloin and the Resin of Aloes,” to the North British Branch of the Pharmaceutical Society of Great Britain. The paper is not suited for complete extraction, but a few interesting points have been extracted in the following: The three most important constituents of aloes are, 1, a volatile oil; 2, aloin; 3, resin of aloes.

*Volatile Oil of Aloes*.—This was first discovered by the Messrs. T. & H. Smith, of Edinburgh, who exhibited a sample in 1873 at the Vienna Exhibition. 400 pounds of aloes yielded by distillation but a single ounce of this oil, which is a pale-yellow mobile liquid, sp. gr. 0.863, boils at  $266^{\circ}$ — $271^{\circ}$  C. ( $= 510.8^{\circ}$ — $519.8^{\circ}$  F.), and has an odor and taste reminding of oil of peppermint. To this the odor of aloes is due.

*Aloin* constitutes about 25 per cent. of aloes, and is supposed to differ as obtained from various kinds of aloes in regard to their solubility, boiling-point, and crystalline form, as well as in regard to their ultimate composition. The aloins are supposed to be members of a homologous series, in which the difference is  $\text{CH}_2$  ( $\text{O} = 16$ ).

The aloin from Socotrin aloes (Socaloin), .	= $\text{C}_{15}\text{H}_{18}\text{O}_7$	} ( $\text{O} = 16$ .)
“ “ “ Natal “ (Nataloin), .	= $\text{C}_{16}\text{H}_{18}\text{O}_7$	
“ “ “ Barbadoes “ (Barbaloin), .	= $\text{C}_{17}\text{H}_{20}\text{O}_7$	

The theory requires to be proved, however. Aloin is an oxidized hydrocarbon, and leaves no ash when burned. This

latter fact is of importance in connection with the view of some regarding the

*Resin of Aloes*, which, by Dr. Tilden and others, is regarded to be a modified aloin—aloin oxidized or otherwise changed by the air. The Messrs. Smith furnished the author with the particulars of experiments by which they prove that 883 grains of resin of aloes, prepared in the manner described below, yielded to alcohol 753 grains, which, when burned, gave 1 per cent. of ash, while the 130 grains of residue gave 23 per cent. of ash. The resin, obtained in the ordinary way, was purified by four washings with water, then dissolved in rectified spirit, and agitated with boiling water. From the emulsion-like mixture the resin separated in a fine state, and as devoid of aloin as any resin could well be. That this is not modified aloin, the presence of mineral matter seems abundantly to prove. The

*Changed aloin*, experimented with by the author, was obtained from the mother liquors of 4 ounces of aloin, from which 2 ounces of aloin had been recrystallized for the Vienna Exhibition, and the residue (mother liquid) neglected for some months. Upon the addition of distilled water, and allowing the mixture to stand eight months, a dark-colored substance had formed, which was easily reduced to powder, and constituted the "changed aloin." This Dr. Craig found to possess decided physiological action, and he thus proves that aloin, having undergone chemical change by exposure to air, has not necessarily lost its medicinal activity. His experiments with the "resin of aloes" prove that when it is thoroughly exhausted of aloin it possesses no purgative properties, and that it is not the cause of griping which sometimes follows the administration of aloes, such griping being probably due to impurity in the drug. The author's conclusions are supported by an extensive series of physiological experiments, for which see Ph. Jour. Trans., April 17th, 1875, pp. 827-832.

#### BROMELIACEÆ.

*Agave Americana*.—The successful use of the juice of this

plant by the United States Army, on our Mexican frontier, for the prevention of scurvy, seems to have again drawn attention to this plant and its products, and Mr. J. R. Jackson, curator of the Museums and Royal Gardens, Kew, has communicated to the *Pharmaceutical Journal and Transactions* (December 12th, 1874, p. 461) a paper on the subject, from which the following is extracted: The discovery of the juice of the "maguey" plant as an intoxicating beverage is dated back as far as the year 1045 to 1050, under the reign of the eighth king of the Taltec tribe. There is no doubt that the divers properties of the plant itself were known many years before the discovery of Mexico by the Spaniards. Several varieties of the plant are cultivated in Mexico, each being known for the greater or lesser quantity of juice it produces, its color, whether yellow or greenish, its thickness, or sweet or bitter taste. Though the plant is cultivated in many parts of Mexico, it is in the plains of Apam that the greatest agave district is situated, more than 600 square leagues being here covered with the plant, either in its wild, or cultivated condition. To collect the juice or "pulque," as it is called, as soon as the leaves begin to turn yellow, a small concave aperture is scooped in the core of the plant, and an elongated tube-like gourd, the air in which is exhausted by suction, is thrust into the aperture. The gourds, as soon as filled, are emptied into impervious sheepskin bags, strapped on the back of the laborer, who has fifty to sixty plants in charge. Sometimes two collections are made from the same plant in one day. The juice is allowed to ferment for thirty-six hours in vats made of bullock's hides covered with lime, which are placed beneath long and well-ventilated galleries. During the fermentation of the yellow transparent juice called honey-water, the color changes and it becomes milky white, and is then ready for use. It is estimated that about 50,000,000 bottles of this liquid are annually introduced into the city of Mexico alone. Besides this pulque, which is the chief product of the agave in Mexico, a strong spirit is prepared from the sap, known as mezcal, also a kind of brandy of 80 degrees of strength, a sweet, thick substance resembling honey, a con-

centrated gum used in medicine, brown sugar, loaf sugar, and vinegar of excellent quality, so that the *agave* is one of the most important economic plants of Mexico. Ph. Jour. Trans., Dec. 12th, 1874, p. 461.

#### IRIDACEÆ.

*Saffron*.—Jul. Müller had, about a year ago, received a lot of saffron, which contained 25 per cent. of carbonate of calcium as adulterant. He has lately received another parcel of unexceptional appearance, which contains 9 per cent. of sulphate of barium. The adulterant was not detectable by the naked eye, but was readily separated by washing with water, collecting the deposit, etc. Arch. Pharm., December, 1874, p. 517.

*Cultivation of Saffron*.—The cultivation of saffron in France is limited to three departments, of which that of Loiret produces the best quality and the largest quantity. A saffron plantation fails to yield a full crop after the second year, and is completely exhausted after the third, and the fields are then unfit to be used for the same crop for the next fifteen or sixteen years. An acre furnishes about 700,000 bulbs, each bulb about 3 flowers, and 30,000 flowers yield 2 pounds of fresh stigmas, which when dry weigh about two-fifths of a pound. The yield during the second and third year varies between 9 and 27 pounds per acre. The cost of collecting varies between ten pence and four shillings (women and children being employed), per pound of fresh stigmas. They are dried upon horse-hair sieves over small charcoal furnaces. Arch. Phar., Dec., 1874, p. 567; from Ph. Jour. Trans., 1874.

#### MARANTACEÆ.

*Maranta*.—The German Pharmacopœia requires that arrow-root, when mixed with 10 parts of a mixture of 2 parts of muriatic acid and 1 part of water, should not gelatinize after agitating for ten minutes. Calmberg has recently had occasion to apply this test, and used for this purpose two samples imported from reliable firms in England, and five samples



purchased from reliable apothecaries in Darmstadt. Notwithstanding that these arrowroots, with a single exception were composed of large granules, uniform in size, not a single one responded to the test. The various samples gelatinized almost immediately after mixing, and the author therefore regards the test based on erroneous observation. Arch. Ph., April, 1875, p. 352.

#### ZINGIBERACEÆ.

*Ginger.*—In connection with his paper upon adulterated ground ginger, H. Pocklington gives some valuable instruction upon the microscopical examination of the ginger in the whole as well as in the ground state, and illustrates his paper by drawings representing the starch-granules, increased to 500 diameters, of ginger, Rio arrowroot (manihot?), pea, potato (including abnormal forms), wheat (normal and altered granules), arrowroot, and rice. The author shows that, at Leeds, the adulteration of ginger is carried on to an enormous extent, the adulterants being pea meal, ground rice, wheat or barley starch, damaged arrowroot, maize, etc. Ph. Jour. Trans., June 26th, 1875, p. 1025.

#### ORCHIDACEÆ.

*Cypripedium.*—Prof. H. H. Babcock believes *Cypripedium spectabile* and *C. pubescens* to possess poisonous properties similar to *Rhus toxicodendron*. Being, as is inferred from his paper, particularly susceptible to the influence of the *Rhus* poison, he had for a number of years carefully avoided the plant. Nevertheless, he was affected in the latter part of May and June of each year, with the symptoms and results usually ascribed to *Rhus* poisoning. Upon tracing up the records of his botanical collections, he discovered that the poisonous effects appeared each season on the day after he had collected *Cypripedium spectabile* or *C. pubescens*. During the last two seasons, he has carefully avoided these two species of *Cypripedium*, and has taken no unusual pains to avoid the *Rhus*, and, as he suspected, he has completely escaped poisonous infection. The Pharm., January 1875, p. 1.

*Cypripedium Acaule*, Linn.—H. Northam Bryan has subjected the roots to a partial chemical examination, and found, besides tannin, sugar, and starch, a minute quantity of volatile oil, and a resinous matter soluble in bisulphide of carbon, alcohol, and ether. About 10 per cent of solid matter was also yielded to ether, which was only partially soluble in alcohol; the insoluble portion producing a blood-red color with sulphuric acid. A. J. Ph., February, 1875, p. 54.

*Vanilla*.—Some little uncertainty exists as to which of the species produces the most valuable fruit. It appears, however, that *V. planifolia* and *V. aromatica* are the most important, although *V. guianensis*, *V. palmarum*, and *V. pompona* also yield some of the vanilla of commerce. It is somewhat remarkable that its cultivation in the West Indies has not been largely undertaken, that region being evidently well adapted. It is even probable that it may be profitably cultivated in England, as the English-grown pods (fine examples of the plant may be seen in the tropical and economic houses at Kew) are very highly flavored. Its cultivation in Mexico is carried on principally at Misantla, twenty-four leagues northwest of Vera Cruz. Five varieties are recognized by the growers, one of which, the vanille de couchon, is so called from emitting an offensive smell whilst drying. The harvest begins about December, when the fruit becomes yellowish-green. There are two methods of preparing it for market. In one method the fruit is allowed to dry until it loses its green color. Straw mats covered with woollen blankets are spread on the ground, and when these are warmed through the fruits are spread on them and exposed to the sun. After a time they are wrapped in blankets, and placed in boxes covered with cloths, after which they are again exposed. In about twelve hours the fruits should become of a coffee color, but if they do not the process is repeated. After about two months daily exposure they are tied up in bundles of fifty, and packed in tin boxes. The five varieties mentioned are known, in the order of their quality, as *primiera*, *chica prima*, *sacate*, *vesacate*, and *basura*, the latter being very small, spotted, and much cut or broken about. The second method consists

in stringing up about 12,000 pods by their lower end, as near as possible to the footstalk; plunging them into boiling water for an instant to blanch them; hanging up in the open air, and exposing to the sun for a few hours; and next day smearing lightly with oil, and surrounding them with oiled cotton to prevent the valves from opening. As they become dry, on inverting their upper end they discharge a viscid liquor from it, and they are pressed several times with oiled fingers to promote its flow. The dried pods, like the berries of pepper, change color under the drying operation, grow brown, wrinkled, soft, and shrink to one-fourth their original size. In this state they are touched a second time with oil, but very sparingly, because with too much oil they would lose some of their delicious perfume. Ph. Jour. Trans., July 11th, 1874, p. 24.

Mr. J. R. Jackson communicates some interesting facts upon vanilla, from which the following additional points of interest are extracted: Pereira mentions five species as probably contributing "some of the vanilla of commerce," namely, *V. planifolia*, Andrews, *V. aromatica*, Swartz, *V. guianensis*, Splitberg, *V. palmarum*, Lindl., and *V. pompona*, Schiede. By some authors *V. sylvestris*, Schiede, and *V. sativa*, Schiede, have also been considered good species, yielding some of the best Mexican vanilla. Dr. Pereira, however, considered them as varieties of *V. planifolia*. M. Delteil, whose pamphlet, "Étude sur la Vanille" (devoted to the vanilla plant in all its bearings, and largely to vanilla as a product of the island of Reunion), is the immediate occasion of Mr. Jackson's paper, refers Mexican vanilla to the following species: *V. sativa*, *planifolia*, and *pompona*; Guiana and Surinam to *V. guianensis*; Bahia to *V. palmarum*; and that of Brazil and Peru to *V. aromatica*. Professor Flückiger and the late Mr. Hanbury in "Pharmacographia," give the botanical origin of vanilla as *V. planifolia*, Andrews, and refer to no other species. Vanilla is cultivated in various parts of tropical America, and has been successfully introduced into Mauritius and Reunion, from whence large quantities are annually imported. Java also grows vanilla to a considerable extent. To the cultivator

it is a very remunerative crop in situations where climate and atmospheric conditions are suited to it. It is very easy of cultivation by fastening shoots to the trees, into the bark of which they soon strike their roots, growing luxuriantly, bearing fruit when they are about three years old, and continuing to do so about forty years. Under natural conditions the flowers are impregnated by insect agency, but artificial fecundation is frequently resorted to; indeed, it is one of the principal points of consideration in M. Delteil's work. Pomet, in his "Compleat History of Druggs," speaking of the collection of and preparation for commerce of the vanilla "pods or cods," says: "When they are ripe, the people of Mexico, those of Guatemala and St. Domingo, gather them, and hang them up by one end in the shade to dry; and when they are dry enough to keep, they rub them with oil to hinder them from drying too much, and prevent their breaking, and then they put them up in little bags of fifty, a hundred, or a hundred and fifty, to bring them hither. Nevertheless, there are some who value their gain more than their conscience, who let them hang upon the stalk till over-ripe, and receive from them a black, fragrant balsam, that flows till the essential part of *vanilla* is exhausted, and it can run no more; and then they gather the pods, and pack them up for sale as aforesaid." As to what becomes of the "fragrant balsam," he says: "The Spaniards keep that, for we have none of it brought to us." At the present time the pods are gathered before they are quite ripe. Ph. J. Trans., May 8th, 1875, p. 886.

#### THYMELACEÆ.

*Daphne Mezereum*, L.—A Morocco drug, called "Adad," had previously been recognized to be composed of the roots of *D. Mezereum*, L. Leared and Holmes have since had opportunity to examine a new specimen of "Adad," and decide that the root is certainly not that of *D. Mezereum*, L. The root is large, somewhat cylindrical, more than a foot long, and about two inches in diameter. It has a crown consisting of several stems, springing from the contracted upper portion of the root. The transverse section is white and starchy, but,

nevertheless, is hard and tough, and shows about six ill-defined concentric rings, marked with horny-looking radiating lines, which, under a lens, are seen to consist of vessels containing matter resembling caoutchouc. This latter substance has also exuded from several parts of the root, where it was apparently injured in the fresh state. The smell and taste of the root are aromatic. The authors have been unable to identify it. Ph. Jour. Trans., January 2d, 1875, p. 522.

#### LAURACEÆ.

*Ngai Camphor*.\*—Besides the camphors obtained from *Cinnamomum camphora*, F. Nees et Eberm., and from *Dryobalanops aromatica*, Gærtn., there is a third variety of camphor, not so well known, the source of which has been investigated by Mr. Daniel Hanbury. Rôndot refers to this camphor, in his work on Chinese commerce, and states that it is obtained from the leaves of a plant known in China under the name of *Ngai*, a variety of *Artemisia*. Mr. Hanbury caused inquiry to be made with reference to the plant, and through Mr. Frederick H. Ewer was placed in possession of two forms of camphor, the one a perfectly colorless crystalline substance, in flattish pieces, as much as an inch in length; the other is a crystalline powder of a dirty-white appearance, mixed with some fragments of vegetable tissue, and regarded by Mr. Ewer as the crude state of the drug. A specimen of the plant was also furnished by Mr. Ewer, but was found by Mr. Hanbury not to be a species of *Artemisia*. It proves to be *Blumea balsamifera*, D. C., a tall, coarse-looking, herbaceous plant of Eastern Asia, an abundant weed in Assam and Burmah, and common throughout the Indian islands.

Mr. Sydney Plowman has examined the *Ngai* camphor, both physically and chemically, and gives to it the following characteristics: It occurs in non-transparent grains, possessing considerably greater hardness and brittleness than laurel camphor. On the upper portion of the bottle, in which it had

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\* Although this variety of camphor seems to be obtained from a plant belonging to the Nat. Ord. Composita, it is more conveniently considered with the family to which the ordinary camphor plant belongs.—C. L. D.

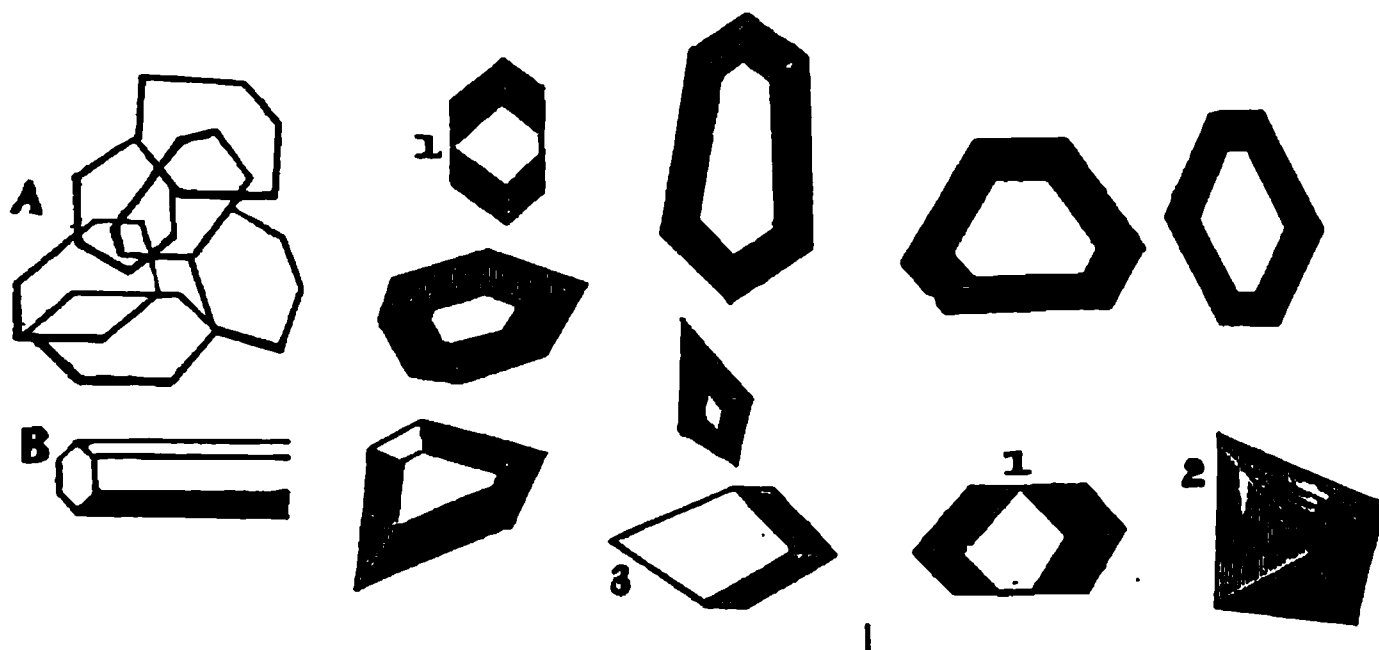
been kept for several months, numbers of small, separate, well-defined crystals were formed by its spontaneous sublimation. Laurel camphor, placed under exactly the same conditions, sublimed much more freely, so that masses of crystals, rather than single crystals, were deposited in the upper portion of the bottle. A specimen of Borneo camphor, although it has remained in the Museum of the (Pharmaceutical) Society for several years, has not sublimed in the slightest degree.

The author, in order to compare their crystalline forms, placed a grain of each in separate tubes, covered with a microscopic glass, and exposed them for a month to a temperature of  $24^{\circ}\text{C}$ . ( $= 75.2^{\circ}\text{F}$ ). Viewed microscopically, the laurel camphor exhibited masses of six-sided tabular crystals (A), with a few six-sided prisms (B) scattered amongst them. Their volatility was so marked, that even while under the microscope they lost the sharpness of their angles, and soon degenerated into ill-defined masses. The Borneo and Ngai camphors, on the other hand, sublimed in singularly beautiful, well-defined, and for the most part solitary crystals, which preserved their sharpness extremely well. They resembled each other in a remarkable degree, and it would be impossible to give any characters by which they could be distinguished, some of the crystals of the two being absolutely identical in outline (1). They were principally of a pyramidal form, with a varying number of sides, generally truncated, but sometimes perfect, then appearing as the halves of octahedra (2), while a few seemed to belong to the doubly oblique prismatic system (3).

The melting-point of each was ascertained, and was found for laurel camphor  $= 177^{\circ}\text{C}$ . ( $= 360.6^{\circ}\text{F}$ .); for Ngai camphor  $= 204^{\circ}\text{C}$ . ( $= 399.2^{\circ}\text{F}$ .); for Borneo camphor  $= 206^{\circ}\text{C}$ . ( $= 402.8^{\circ}\text{F}$ .). The author having, besides the above experiments, ascertained the action of acids, the density of their vapors, and their ultimate composition, etc., concludes that Ngai camphor is isomeric with Borneo camphor, but differs in physical properties, viz., its much higher volatility, its perceptibly different odor, and somewhat greater hardness and brittleness. Its odor approximates to that of laurel camphor,

but is much less powerful; that of Borneo camphor being, besides weak camphoraceous, also disagreeably peppery. Ph. Jour. Trans., March, 1874, pp. 709–710.

FIG. 29.



Professor Flückiger being in possession of some of the same samples of Ngai camphor has examined them, and has made the following additional observation: The new camphor from the Ngai plant, *Blumea balsamifera*, D. C., of the order *Compositæ*, crystallizes in the cubic (regular) system, like that of Borneo from *Dryobalanops*. Both, according to Mr. Plowman, agree to the formula  $C_{10}H_{18}O$  ( $O = 16$ ), but his experiments prove that the Ngai camphor in alcoholic solution deflects the ray of polarized light to the left, while that of Borneo camphor deflects to the right; the degree of deflection being the same in both. The author furthermore points out the relation of the new camphor to *Terecamphene*,  $C_{10}H_{18}$  ( $O = 16$ ), and the monochlorhydrate of the oil of turpentine of *Pinus pinaster*, Solander, and other pines. He also mentions as an interesting fact that the camphor, obtained by Jeanjean in 1856 among the products of the fermentation of the sugar contained in madder, the root of *Rubia tinctorum*, L., has the composition and rotary power of Ngai camphor. Jeanjean had, by boiling the crystals of *Rubia* camphor with nitric acid, obtained the compound  $C_{10}H_{18}O$  ( $O = 16$ ), agreeing in composition with ordinary camphor, but differing from it by deviating the ray of polarized light as much to the left as common camphor does to the right hand. Professor Flücki-



ger, by similar treatment of Ngai camphor, obtained crystals which were entirely devoid of the peculiar odor of Ngai camphor and rather reminded of the ordinary camphor; but the small amount of camphor at his command precluded the possibility of continuing the investigation. The polariscope, however, proved the crystals of the altered camphor not to belong to the same system as their mother substance; they displayed brilliant colors, showing that there was no longer any question of the cubic system. That Dryobalanops (Malay) camphor is by the action of nitric acid converted into a camphor, absolutely identical with ordinary camphor, is a well-known fact. Ph. Jour. Trans., April 18th, 1874, p. 829.

*Compressed Camphor.*—A partially purified camphor has been introduced by W. F. Simes & Co., of Philadelphia, which, owing to the method of its preparation, is called “compressed” camphor. It is prepared from the Japanese crude camphor, by distilling it into a large chamber, having projections so arranged as to lengthen the course of the vaporized camphor. In the first partition the product is mostly in the pulverulent form; in the last it crystallizes in beautiful snowflake-like crystals. The crystalline powder is placed in iron moulds, which are moistened to prevent the camphor from adhering, and by hydraulic pressure is pressed into rectangular blocks of various weights. The camphor, so refined, still retains the water and volatile oil originally contained in the crude camphor, and the exterior of the blocks is apt to be discolored by rust on the iron moulds; the ordinary refined camphor is therefore preferable for medicinal purposes, while this variety, owing to its less rapid evaporation, recommends itself for preventing the ravages of moths. A. J. Ph., December, 1874, p. 582.

*Camphor* is refined in Philadelphia as follows: Crude camphor, as brought into this country, is introduced together with quicklime into cast-iron vessels, which serve as retorts, over which are placed covers of sheet-iron connected with the lower vessels by a small aperture. A number of these stills are placed in a large sand-bath, and, after the melting of the camphor within them, kept at a uniform temperature that



the process may go on quietly. The quicklime serves to retain the moisture that otherwise would interfere with the condensation of the pure camphor. This takes place under the shelf upon which the cone (cover?) stands, the vapor, when in excess, passing into the loosely affixed cones of sheet-iron, care being taken to keep the hole open. A good deal of attention and experience are requisite to successfully refine camphor, but the process is now well understood in this country, and the product is of satisfactory quality and appearance. A. J. Ph., February, 1875, p. 55; from Philadelphia Drug Exchange Circ., No. 20.

*Oreodaphne Californica*, Nees.—Mr. J. P. Heamy gives a botanical description of this evergreen, known familiarly in California, where it is indigenous, as the “California Bay Laurel.” The tree attains considerable size and is valued for its wood, used in ornamental cabinet work on account of its grain. All parts of the tree abound in volatile oil, which, however, is contained most abundantly in the leaves (about 4 per cent.). The author has subjected this oil to examination, and finds it to be composed of a hydrocarbon and an oxygenated oil. To the hydrocarbon the aroma of the oil is due, while its peculiar pungency is due to the oxygenated portion, which the author has named *oreodaphnol*. See Volatile Oils, in this Report. A. J. Ph., March, 1875, pp. 105–109.

#### POLYGONACEÆ.

*Botanical Source of Medicinal Rhubarb*.—Maximowicz, while he does not dispute the fact that the *Rheum officinale* of Bailon (see Proceedings, 1873, p. 211) yields a commercial rhubarb, nevertheless maintains that the drug which reached commerce through Siberia by way of Kiachta was the produce of

*Rheum palmatum*, var. *Tanguticum*, a description of which plant, accompanied by a figure and some historical notes, is given by the author in “Regel’s Gartenflora” for January. The plant described was collected by Przewalski, in 1872–3, in the vicinity of Lake Koko Nor, Northwest China, where

it is extensively cultivated, and the wild plants are also collected. The author's description of the plant corresponds in all respects with the specimen in the Kew herbarium, labelled "*Rheum palmatum*, from Pallas." His account of the method of its cultivation and preparation gives but little additional information to the general knowledge on the subject. There seems to be no doubt that the seed obtained by the Russian officials in 1750, and spread from Russia over various parts of Europe, was that of the true plant, and so, according to Maximowicz, we have been seeking for a plant we already possessed. According to this author, the trade by way of Kiachta has been destroyed in consequence of the attempt of some tribes to overthrow Chinese rule; but the critic in the "Gardener Chronicle" (March 27th, 1875) prefers to accept the statement in "Flückiger and Hanbury's Pharmacographia," that this is in consequence of the very strict supervision exercised by the Russian government. The cultivation of *Rheum palmatum* in Europe has, according to Maximowicz, proved rather unprofitable on account of the principal roots decaying, and thus leaving only the lateral ones; and he adds that to a certain extent this has been the case with other species. The abovementioned critic states that these remarks do not apply to England, however. *R. rhaponticum*, *R. undulatum*, and others are hardier than *R. officinale*, which was rather severely injured by frost at Kew last spring. Ph. J. Trans., April 3d, 1875; from the Gardener Chronicle, March 27th, 1875.

*Rhubarb*.—G. Bille had made the statement that a fluid extract, prepared with water as the menstruum, represented all that is active in rhubarb root. Charles A. Heinitsh finds that this statement is erroneous, since rhubarb exhausted previously by water, yielded to alcohol an extractive, which in 3-grain doses was laxative, and in 6-grain doses purgative. See Proceedings, 1874, p. 390.

*Rhubarb*.—C. Husson has made the observation that rhubarb possesses the property of absorbing (or combining) with a certain amount of iodine, and rendering it inactive upon starch parts. While this is doubtless due, in a certain degree, to the presence of alkaline salts, he believes that the

organic matters are also concerned. Based upon this observation, he proposes solution of iodine as a method to determine the quality of rhubarb, believing that the better qualities will absorb or neutralize more iodine than the poorer grades. He also suggests that the property of rhubarb to absorb an abundance of iodine may find useful therapeutic application in masking the iodine completely, and proposes an iodized syrup of rhubarb, for which see Syrups, in this report. The author's method of applying his test, and some of his results, are detailed in Ph. J. Trans., May 29th, 1875, p. 950.

#### CHENOPODIACEÆ.

*Phytolacca decandra*.—Ch. H. Cressler draws attention to the remarkable poisonous effect produced upon five adult persons and a child in his establishment, by inhaling powdered poke-root. The root had been collected in November, and was being prepared for percolation in January. The author, his three clerks, the porter of the establishment, and a child, all inhaled a portion of the powder, and each was attacked with symptoms resembling a severe cold, followed in some cases with vomiting and purging. The powdering had been conducted in an Enterprise drug mill, and was conducted, as was also the packing with a percolator, with the ordinary precautions. A. J. Ph., May, 1875, p. 196.

#### AMARANTHACEÆ.

*Beet-roots* contain, according to G. Krause, independently of the cane-sugar, grape-sugar to the extent of about 0.1 per cent. In spring, when the root has remained underground during winter, the proportion may rise to 0.3 or 0.4 per cent., and a moist season is also favorable to its production. The amount of glucose may be determined by shaking 100 c.c. of the beet-root juice with 10 c.c. of basic acetate of lead, filtering the mixture, washing residue, and mixing filtrate, and washings freed from excess of oxide of lead by carbonic acid, an excess of carbonic acid being avoided to obviate even the slightest acidity of the liquid. The neutral acetate of lead present is

then precipitated with carbonate of sodium; the liquid is boiled for a quarter of an hour to coagulate albumen, is then filtered, heated to  $100^{\circ}$  C. ( $= 212^{\circ}$  F.), and mixed with Fehling's test-liquid in slight excess. After digesting for an hour on a water-bath, the suboxide of copper formed is collected, and converted into oxide by ignition in contact with air. The weight of this oxide, multiplied by the factor 0.4534, gives the weight of glucose present in the juice. It is necessary to operate rapidly, and to avoid carefully acidity in the liquid. Ch. News, Aug. 14th, 1874; from Bull. de la Soc. Chim. de Paris.

#### PLUMBAGINEÆ.

*Statice Mucronata*, L.—A drug from Morocco, consisting of the roots of this plant, has been received by Leared and Holmes under the name "Tarifa," and identified by them from leaves and flowers received at the same time. The root is of a dull-brown color, from half to one inch in diameter, with numerous transverse striæ and a few scattered warts. The medullium is white, and the cortical portion thick, white, and spongy. Its taste is saltish and pungent, and it is supposed to possess nervine properties. Ph. Jour. Trans., January 2d, 1875, p. 522.

#### SCROPHULARIACEÆ.

*Digitalis*.—The experience of Nativelle corresponds with the observation made by Dr. Withering about one hundred years ago, who says: "The leaves of the foxglove must not be collected before the second year, when the first flowers begin to appear; they must be deprived of their stems and the greater part of the midrib, and their parenchymatose portion only used." The plant of the first year's growth does not contain much crystalline digitalin; if it is fleshy and juicy, it is rich in digitalëin and extractive. Digitin, a crystalline but inert substance, and which, therefore, must not be confounded with digitalin, is found in the young as well as in the older plant. The leaves of the second year's growth, gathered when the flowers appear, yield the most digitalin, and should be used in medicine. It is important that the leaf-stems are

removed, since they are practically inert. The author obtained from 100 grams of the stems but 2 milligrams; whereas from 100 grams of the parenchymatose portion of the leaves he obtained 10 centigrams of digitalin, or fifty times the quantity obtained from the stems. The average yield, by the author's improved process (see Digitalin, in this report), is about .01 per cent. Ph. Centralhalle, No. 47, 1874, p. 387.

*Verbascum Sinuatum*, L.—The root seems to be used in Morocco for sore eyes, and is there called "*Emsleh ander*." Leared and Holmes, who recognize it by the stems and leaves attached to the root, describe it as follows: A tapering cylindrical root, varying in thickness from half to one inch, and from six to nine inches long, deeply furrowed, and of a dark-brown color externally. It is readily distinguished from other roots by its black, horny, cortical portion, which has a polished or waxy appearance when cut. The medullium occupies three-quarters of the diameter, and is generally of a more or less dark-gray color, with sometimes a paler zone next to the bark. The taste is sweetish and slightly bitter. Ph. Jour. Trans., January 2d, 1875, p. 522.

#### SOLANACEÆ.

*Braço do Preguiça, or Velame*.—A Brazilian drug of this name has been presented to the Pharmaceutical Society of Great Britain, and is described by E. M. Holmes. It consists of large brittle leaves of a papery texture, which are, as far as can be judged from their broken-up state, about a foot long and nine inches broad, of a dark-green color above, and white and hoary underneath, which latter is owing to a dense covering of stellate hairs, and these are almost entirely absent on the upper surface. The veins are depressed on the upper surface of the leaf, and prominent beneath. The stalks and petiole are also densely covered with a thick coat of down, and with a number of linear-brownish scales like those on the base of the fronds of ferns. Dr. Barnsley refers the plant to *Solanum jubatum*, Dumal, and the leaves correspond exactly to specimens of that species in the British Museum; but an

entire leaf sent with the drug, which is without scales on the petioles, is referable rather to *Solanum bullatum*, Vell. According to Dr. Barnsley, the leaves and root of this plant are used in the form of infusion or extract, and are considered to possess excellent antisyphilitic properties. They are sometimes used as a purge, and Martius states that "Braço do Preguiça" is used as a resolvent in congestion of the bowels, and as an external application for cleansing and healing wounds and ulcers. Ph. Jour. Trans., May 15th, 1875, p. 905.

*Tobacco*.—Prof. J. W. Mallet, of the University of Virginia, communicates to the Chem. News (Sept. 4th, 1874) an analysis of six samples of Virginia tobacco. The analysis comprises the determination of the ash constituents, the amount of nitrogen, the amount of nicotina, etc. Of the latter the tobaccos, dried at 100° C., contained respectively 3.325, 3.586, 5.276, 7.086, 6.202, and 8.862 per cent.

#### JASMINACEÆ.

*Chionanthus Virginica*, Linn.—R. S. Justice has found the bark of the root of the fringe tree to contain saponin. He obtained, with strong alcohol, by percolation, 25 per cent. of an extremely bitter extract, from which he obtained the saponin by Rochleder's process. Two hundred and forty grains of the extract were dissolved in water, solution of baryta added as long as a precipitate resulted; this was collected on a filter, washed thoroughly with baryta-water, and was then redissolved in water. The solution was filtered, carbonic acid passed through to precipitate baryta, again filtered, evaporated to syrup, and dried on glass plates. A straw-colored powder resulted, which possessed all the characteristics of saponin. A. J. Ph., May, 1875, p. 195.

#### LABIATÆ.

*Mint*.—Both *spearmint* and *peppermint* are largely grown at Mitcham, particularly the latter; indeed, this crop ranks second only to lavender. It is first planted in rows, thirteen inches apart each way, and at the end of the next two seasons it is ploughed in. The plantations are kept free from weeds

during the summer by means of hoes; and about the end of the first week, or during the second week of August, is the usual time for cutting the mint for distillation. In the Fulham fields, and in other districts in which market-gardening is carried on, mint is largely grown for sale in the green state. For this purpose the dampest piece of ground is selected for its culture, if it is to be a permanent plantation, but it will grow in almost any soil. It is planted in rows, a foot apart, and the ground is intercropped the first year, but afterwards it runs through the soil in such a way that it becomes a complete mass of undergrown stems and roots. Ph. Jour. Trans., September, 1874, p. 182; from The Garden.

*Sage* forms an important crop at Mitcham, which, under favorable circumstances, is pretty remunerative, the stalks being cut over, bunched, and sent to market at once. New plantations are formed with rooted slips, obtained by dividing the old plants; they are inserted, late in spring, in rows one or two feet apart, and about a foot asunder in the rows. During the first season, parsley or lettuce forms an intercrop, which also occupies the ground during the earlier part of the succeeding ones. Except hoeing and cleaning, the plantations need no care as long as they are in a thriving condition; and when the lines get broken, and blanks and sickly plants occur, the plantation is broken up. Ph. Jour. Trans., September, 1874, p. 182; from The Garden.

*Lavender*.—This is extensively cultivated at Mitcham, both farmers and cottagers bestowing special attention on it; and this district presents a lovely sight in the last fortnight in July, when the different fields of it are in full bloom, the air for miles around it being loaded with its fragrance. Lavender is increased by means of rooted slips planted out, in rows about eighteen inches apart and half that distance asunder, in March and April. Sometimes the sets are planted as wide in the row as the drills are apart. For the first year the produce amounts to but little, and therefore parsley or lettuce is planted between the rows. As soon as the plants have grown sufficiently to become crowded, every alternate row, and every al-

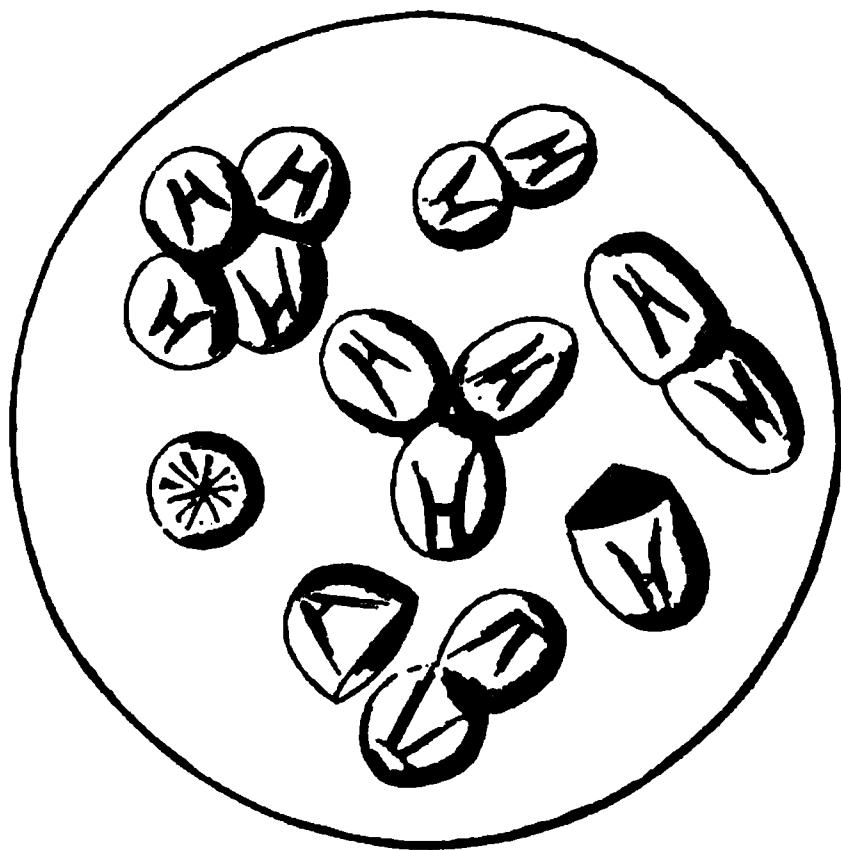


ternate plant in the rows left, are lifted—say in spring—and transplanted into another field, so as to form a new plantation. Thus the plants stand three feet apart each way, or three feet one way and eighteen inches the other. Coleworts, lettuce, or other early and quickly-matured crops are raised among the lavender in the early part of the year; but, after June, all such catch-crops are removed. The flowers are usually harvested in the first fortnight of August. *Ph. Jour. Trans.*, September, 1874, p. 182; from *The Garden*.

#### CONVOLVULACEÆ.

*Scammony*.—According to T. Greenish, four kinds of scammony appear in English commerce: Virgin scammony, of which about 800 pounds arrive and *none of which is exported*; Angora scammony and Syrian scammony, of which two varieties, about half a ton is annually imported, and about one-half of which remains in England; and Skeleep scammony, of which about one ton annually arrives in London, and about one-half is exported. The Angora and Syrian scammonies

FIG. 30.



vary in amount of resin from 46 to 76 per cent., while the Skeleep contains but about 36 per cent. According to Mr. Maltass, the peasants adulterate scammony before bringing it into the market, the adulterants being wheat, starch, wood, ashes, earth, gum arabic, or tragacanth, pounded scammony roots, etc. In the author's opinion it is of importance to distin-

guish the scammony starch from that of wheat, etc. The accompanying illustration (Fig. 30) shows the starch-granules peculiar to scammony-root. The author has never discovered



starch-granules in the lump *virgin* scammony, but has found it in every sample of powdered *virgin* scammony, and sometimes a little wheat starch in addition.

The scammony starch-granules are, for the most part, composed of two, three, and sometimes more granules. In shape the single granules resemble those of *Tacca*, muller-shaped, with dihedral base, and the hilum approximates to that seen in the starch of orris-root. With polarized light the arms of the black cross run down in the direction of those lines marked on the grains. Occasionally a lenticular grain is met with, but the hilum or markings about the hilum serve to distinguish it from those of wheat starch, to which it otherwise bears a close resemblance. The starch grains from the scammony root vary very much in size about the centre of the root, where the texture is very loose. *Ph. Jour. Trans.*, Oct. 3d, 1874, p. 263.

A. F. Haselden has never found common resin, guaiacum, or jalap resin in commercial scammony. He nevertheless is convinced that the scammony of British commerce is of variable quality, and as scammony resin can be obtained of uniform quality at moderate prices, he advocates its employment, with the sanction of the Pharmacopœia, in place of *virgin* scammony. *Ph. Jour. Trans.*, July 18th, 1874, p. 41.

Aug. Heis has written a prize essay on scammony, which has been extracted for *Arch. Pharm.*, March, 1875 (fol. 223). The constituents of scammony root are besides cellulose, considerable quantities of oxalate of calcium, scammonin, extractive, sugar, starch, tannic acid, mucilage, and traces of wax. The yield to water and to alcohol of three several specimens, small, large, and medium roots, was as follows:

	I.	II.	III.
Soluble in water, . . . .	20.0 p. c.	27.4 p. c.	18.2 p. c.
Of which soluble in alcohol, . . . .	10.7 "	12.8 "	9.8 "
Insoluble in alcohol, . . . .	9.8 "	15.1 "	8.9 "
Soluble in alcohol, . . . .	17.7 "	23.0 "	21.4 "
Of which soluble in water, . . . .	18.2 "	15.7 "	12.1 "
Insoluble in water, . . . .	4.5 "	7.8 "	9.8 "
Amount of scammonin (resin purified by animal charcoal), . . . .	8.4 "	5.11 "	6.6 "

The aqueous extract, taken thrice in doses of 1.5 grams every hour was without purgative action, but produced considerable griping and accumulation of gases in the stomach. The scammonin is obtained from the alcoholic extract, by washing it with water, and treating the residual mixture of scammonin, tannic acid, and coloring matter with animal charcoal. The author describes various samples of *resina scammonii*, as officinal in the German, Dutch, and Swedish Pharmacopœias, and makes some critical remarks on these processes, and on the medicinal properties of scammonin as compared with jalap, resin, gamboge, etc. He finds the scammony resin prepared from the root to contain tannic acid uniformly, while that prepared from commercial scammony is free from it.

*Scammony Resins.*—By his experiments Knujse had rendered it doubtful whether the *scammony resin* obtained directly from the root (according to the process of the German Pharmacopœia) was identical in its composition. Spirgatis has now prepared scammonin from roots obtained from Gehe and Comp., and has found it to be identical in its relation to solvents, in its appearance and in its reactions with the scammonin obtained from the inspissated juice of the plant. Both bodies, as obtained by the author, are amorphous, colorless, transparent, odorless, tasteless, and are combustible with identical phenomena. Knujse had found a difference in the relation to the solvents ether, chloroform, ammonia and oil of turpentine. No such difference exists in the behavior of the two substances to these solvents. Both being readily soluble, when in fine powder, in cold oil of turpentine; the statement found in some pharmacological works, that colophonium may be detected in scammony resin by its solubility in oil of turpentine, must be corrected. Subjected to ultimate analysis, the two resins were found to be identical in composition. N. Rep. Ph., 1874, No. 5, p. 260.

*Exogonium Purga.*—The accompanying cut (Fig. 32) representing the leaves, flowers, fruit, root, etc., of the true jalap plant, illustrates a paper in "The Garden," on the open-air cultivation of the plant in England. Mr. Ellacomb states that the plant thrives well in the open air, as illustrated by

specimens at Bitton, Drayton, Beauchamp, Kew, and Fulham; and it seems to thrive even in the Edinburgh Botanic Gardens, without protection. The author states that at Bitton, if not checked by late spring frosts, it comes into blossom early in September, and continues to flower till cut down by frost. He suggests that perhaps the best situation for the plant would be near a south wall, near a peach or apricot tree, and to let it wind its way through the branches. He also maintains that this is the plant

FIG. 31.\*

FIG. 32.

that gives the name to the medicine called jalap; but, while it yields the best jalap, good jalap can also be obtained from

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\* Fig. 31, Cross-section of jalap root.

other species of *Convolvulus*, even from the British species; for, according to Lindley, *C. arvensis*, *Soldanella*, *macrocarpus*, and probably many others, may likewise be used with equal advantage. The tubers of *E. purga*, as will be seen, are roundish. They are of variable size; those of mature growth being about the size of an orange. Regarding the culture of *Convolvulus Jalapa* in the open air, no experiments seem as yet to have been made in this direction; but, it is suggested, Mr. J. Richardson will possibly give it a trial and report the result. Ph. Jour. Trans., January 9th, 1875, p. 547.

#### BIGNONIACEÆ.

*Caroba paulistana* and *Carobinha* or *Carobada muida*, are the names of two nearly allied Brazilian drugs, which have been examined by E. M. Holmes. The first of these is composed of serrate, the second of entire leaflets.

*Carobinha* consists of bipinnate leaves from 12 to 18 inches long, with 7 to 10 pairs of pinnæ, each pinna having about eight leaflets and an odd one; the leaflets are obovate, slightly unequal-sided, sessile, but tapering below, and resemble the leaves of *Chimaphila umbellata*. The margin of the leaflets is entire, they are smooth on both sides, and minutely dotted beneath, but the dots are not transparent. The petiole is slightly winged on its upper surface so as to appear canaliculate, and the rhachis of the pinnæ is also slightly but more distinctly winged. The leaves appear to correspond well with those of *Jacaranda oxyphylla*, Cham.

*Caroba paulistana* has leaves and leaflets similar to those above described; but the leaflets are serrate about the middle of the leaf and tapering at both ends, and minute hairs are sparingly scattered over the leaf. It seems to correspond well with the description given of *Jacaranda paulistana* in De Candolle's Prodrômus. Martius, however, gives this name as synonymous with *J. oxyphylla*, Cham., of which it may perhaps be only a variety.

The leaves of both species are bitter, and constitute, according to Dr. Barnsley, a very favorite remedy in Brazil, being used in the form of infusion, decoction, and fomentation, with

marked success in the treatment of syphilis, and skin disease arising from it. Ph. J. Trans., May 15th, 1875, p. 905.

#### ASCLEPIADACEÆ.

*Asclepias Incarnata*, Linn., variously called rose-colored silkweed, white Indian hemp, swamp milkweed, etc., has been the subject of investigation by Joseph Y. Taylor, who found the rhizome and rootlets to contain, besides albumen, pectin, starch, and glucose, an alkaloid, indicated by iodohydrargyrate of potassium, fixed oil, volatile oil, and two acrid resins. It yielded to alcohol, sp. gr. .835, 21 per cent. of extract, which contained the fixed oil and the two resins. The air-dried root yielded 8.25 per cent. of ashes, containing silica, and chlorides and sulphates of potassium, sodium, and calcium. A. J. Ph., June, 1875, p. 246.

*Asclepias cornuti*.—The caoutchouc contained to the amount of about 4 per cent. in the juice of the "milk-weed," bids fair to be utilized. Its manufacture from this source has been undertaken by a Canadian company with a capital of \$100,000. Jour. Appld. Ch., April, 1875, p. 55.

*Anantherix decumbens*, Nuttall.—The leaves of this plant seems, according to the testimony of a Mr. Magruder, to be used with success as a remedy against the rattlesnake-bite. Assistant Surgeon Wilson, U. S. A., writes from Fort Bayard, N. M., to the effect that one of the Mexican laborers, in a copper mine, had been bitten in the calf of the leg by a rattlesnake, whereupon another Mexican went out, procured a plant, chewed up some of the leaves, and applied the bolus to the wound, when the swelling (which had become considerable) disappeared in a short time, and the man recovered. Mr. Magruder, whom the Doctor knows to be a gentleman of veracity, procured a specimen of the plant, which was identified by Assistant Surgeon J. J. Woodward, U. S. A., to be that above indicated. Am. Dr. Circ., April, 1875, p. 77.

#### STYRACEÆ.

*Liquidambar*.—Dr. Josef Moeller has had opportunity to study the characters of the various samples of storax in the

Pharmacological Institute of Vienna. Unger, one of the quoted authorities on the storax from—

*Liquidambar Orientale*, Mill., had made the assertion, on the authority of Mariti, that storax is obtained by exudation. The author's examination of the structure and chemical reaction of the bark, led him to regard the views of Hanbury as the correct method of its production; according to which liquid storax is the product of distillation (?) of the bruised bark, and the solid storax is either the dried residue of expression (*Cortex Thymiamatis*), or an artificial product, obtained by mixing liquid storax and sawdust (*Styrax Calamita*). The author describes a number of varieties of storax. He found

*Styrax liquida* to correspond with the description of Flückiger, in his "Pharmakogrosie."

*Resina Storacis Calamitæ*, obtained from London, was in exceedingly brittle pieces, which were readily recognized to be a mixture of resin and of light-brown vegetable substances. It has the odor of vanilla, its odor is increased by heat, and when melted becomes pyrogenous. The resin is readily dissolved by alcohol, forming a brown solution, and leaving a residue of vegetable fragments, composed principally of bark parenchyma, and coarse bark fibres, with here and there a crystal. These components correspond with those found in the tissue of liquidambar, but here and there are found particles belonging to other plants.

*Resina Storacis Calamitæ*, old.—Loosely agglomerating lumps and grains of the size of a millet, of red-brown color, with a dense efflorescence of white crystals upon the surface, giving it a violet tinge. Odor of vanilla. Leaves a considerable ash when burned. The residue remaining after treatment with alcohol is mainly composed of liquidambar tissues and wood, but it contains a considerable quantity of inorganic impurities. It seems, to the author, to be prepared with liquid storax and the rasped wood of the mother plant, but with less care than

*Styrax in granis*, which forms a chocolate-brown brittle mass, moist to the touch, with but sparse crystalline efflorescence, but strong odor, which, when burning a portion, re-

minds of cinnamon. The residue, after treatment with alcohol, proves to be composed of the various parts of liquidambar bark.

*Resina Storacis* consists of black, glistening masses, of pleasant and strong odor, and of a consistence which permits it to be cut. It leaves much ash; is insoluble in boiling water, in which it does not melt; is dissolved by alcohol, leaving a muddy residue, which is composed of inorganic and vegetable impurities. It seems to be a carelessly prepared extract.

*Liquidambar Altingiana*, Blume (*Altingia excelsa*, Noroña).—The author has had opportunity to examine only a small twig of this tree, and two samples of resin, which, in Java, is used in place of benzoin, according to Junghuhn. One of the samples of resin, which had been collected by De Vrij, was composed of small, flat, sharp-edged, translucent, light-yellow pieces, which were quite brittle, odorless, and tasteless. The fracture is quite bright; the surface somewhat dim, and this portion seems to be soluble in water. It is nearly completely soluble in alcohol, and melts at  $94^{\circ}\text{C.}$  ( $= 201.8^{\circ}\text{F.}$ ).

The second sample was obtained from Zollinger, seemed to be quite impure, was in larger pieces, of a brown to occasional black color, and had a melting-point of  $99^{\circ}\text{C.}$  ( $= 210.2^{\circ}\text{F.}$ ). The impurities consisted of fragments of various plants, and undoubtedly also of insects.

*Liquidambar Styraciflua*, L.—The author refers to Procter's studies upon the resinous exudation of this tree, and describes a small branchlet. He regards the three following specimens as derivatives from *L. Styraciflua*, L.:

*Resina Storacis Calamitæ*, Mexico.—The specimen in the Pharmacological Institute possesses the following characteristics: It formed circular flat cakes of about 18 c.m. diameter and 6 c.m. thickness, which consisted of vegetable fragments, held together by a red-brown mass. It yields coloring matter to water, and when heated gives off the odor of cinnamon. The residue, remaining after treatment with alcohol, consists of a coarse powder and small brown splinters, and yields to boiling solution of potassa a brown coloring matter.

*Resina Storacis in granis*, a sample of which has come under the author's notice, occurs in the form of grains from the size

of a millet to that of a pea. It is undoubtedly obtained from the same source as the above, perhaps during an earlier stage of its preparation.

*Balsamum Storacis Mexicanum*.—This is a dark-brown resin, translucent at the edges of a fracture, and occurs in homogeneous masses, contained in earthenware vessels. It is odorless, forms a light-yellow powder, melts at 83° C. (= 101.4° F.), and then gives off a strong cinnamon odor. When burned it leaves no ash, and it is completely soluble in alcohol.

The author finally gives the following résumé of his investigations:

Liquid storax is exclusively the product of *Liquidambar orientale*; all others soon become solid on exposure to air. It is used in Europe to the almost complete exclusion of the other varieties; American storax entering French commerce occasionally, while the Asiatic is consumed at home. The artificially prepared varieties of storax are always moist and sticky when prepared from the oriental variety, whereas those prepared from the other varieties of storax form solid resinous masses or grains. The marks of distinction between Asiatic and American storax are not very plain. *Zeitschr. Oest. Apoth. Vereines*, No. 32, 1874, pp. 593–602.

*Liquid Storax*.—William Miller has subjected storax to extended chemical investigation. By distilling it with steam, by the method recommended by E. Kopp, he obtained *styrol*, but in very small quantities (from 1 pound about 0.5 grams). Although he tried several other methods, he failed to obtain *styrol* in larger quantities, and he is therefore forced to the conclusion that the storax did not contain it in larger quantities. His experience in this respect is not singular, since other authors, Simon, Blyth, Hoffmann, etc., had occasionally obtained large and then again very small yields. The cause for this may be found in the method of obtaining the storax, and perhaps also in the age of the sample by which the liquid *styrol* may assume the solid modification, *meta-styrol*. Regarding the separation of *cinnamic acid* from *styrol*, he finds that this is best obtained, after having distilled off the *styrol*, by treatment with carbonate of sodium, and that 2 pounds of crystallized carbonate of sodium is sufficient for 20 pounds



**storax.** Gössmann had used caustic soda, which has the disadvantage of dissolving also the resins, and Simon, and Blyth and Hoffmann had used the carbonate in much larger proportion (to 20 pounds, 14 and 7 pounds respectively). The storax was digested with a warm solution of the carbonate for several hours, in a capacious vessel to prevent frothing, the clear solution, which reacts slightly alkaline with the proportion above given, was decanted, and, on precipitation with crude muriatic acid, yielded surprisingly pure cinnamic acid. This, however, needed further purification, for which purpose the author recrystallized it from hot aqueous solution. Recrystallization from alcoholic solution, or by sublimation, is far less advantageous, in the latter case considerable quantities of cinnamol being formed. The melting-point of perfectly pure cinnamic acid was found to be  $130^{\circ}$  C. ( $= 266^{\circ}$  F.); Kopp had found it to be  $129^{\circ}$  C. ( $= 264.8^{\circ}$  F.). The residue from the above operations consists of *styracin* mixed with a large proportion of bodies, which have not yet been accurately examined. These bodies were removed for the greater part by cold alcohol, and were subjected to some examination, with incomplete results, however. The portion remaining after treatment with cold alcohol was purified by repeated crystallization from hot alcohol, and expression of the crystals between folds of bibulous paper, by which an oily resinous constituent is removed, which renders its purification very difficult. The further experiments of the author's very lengthy paper pertain to the bromine compound of styracin, and the behavior of styrol to acid sulphite of sodium, for which see N. Rep. Ph., No. 1, 1875, pp. 1-39.

*Storax.*—The presence of the turpentine of the various species of *larix* and *pinus* as adulterants of storax may, according to Hager, be determined by melting a small quantity (5.0 grams) in a test-tube, and exhausting it by agitating three times successively with petroleum ether. Upon evaporating the solution the residue should consist of styrol and styracin only, should be colorless, bluish opalescent, and of pleasant odor. If turpentine is present the residue is yellowish, and has the characteristic odor of turpentine. Good storax yields to petroleum ether about 50 per cent.; if more is taken up the

presence of adulterants may be inferred. Ph. Centralhalle, May 21st, 1874, p. 161.

*Benzoin*.—By the distillation of two samples of benzoin from Sumatra with water or solution of soda, Theegarten has obtained a volatile oil which possesses an odor reminding of naphthalin benzol. From Siamese benzoin he had failed to obtain it. The oil is nearly colorless, insoluble in water, soluble in ether and alcohol, lighter than water, and remains liquid even at a strongly reduced temperature. When heated for an hour to 200° C. (— 392° F.) it assumes a solid condition, and has then become insoluble in alcohol. A few drops added to fuming nitric acid color the acid red, the oil is dissolved, and on addition of water separated as resinous mass. He regards it as a hydrocarbon, and will show, in a future communication, its identity with the styrol obtained from storax. N. Rep. Ph., No. 7, p. 435.

By the action of bisulphide of carbon upon benzoin, Guichard obtained very handsome crystals, which he was inclined to regard as benzoic acid, but which proved upon examination to be a mixture of benzoic and cinnamic acid. The fact is interesting, since it again proves the existence of free benzoic and cinnamic acids in benzoin. Arch. Pharm., Dec. 1874, p. 537; Rep. de Pharm., 1874.

#### LAURACEÆ.

*Benzoin Odoriferum*, Nees.—Perry M. Gleim obtained from 16 troy ounces of the dried and powdered berries, by percolating with petroleum benzin, 7 troy ounces of an oily liquid of a beautiful deep-red color, highly odorous, and of aromatic taste. This oily product has a sp. gr. of 0.925, is soluble in bisulphide of carbon, ether, and chloroform; partly soluble in alcohol, glycerin, and oil of turpentine, and seems to be useful as a stimulant liniment. From 8 troy ounces of fresh berries the author obtained, by distillation with water, 4 fluid drachms of volatile oil, having a sp. gr. of 0.870, and a fragrant odor resembling that of jessamine. The large yield of volatile oil obtained by the author caused the editor of the American Journal of Pharmacy to suggest a closer examination. A. J. Ph., June, 1875, p. 246.

## GENTIANACEÆ.

*Chiretta* has been found in the London markets substituted by a drug very closely resembling it, which Prof. Bentley believes to be a member of the same family, probably *Ophelia angustifolia*, Don, but may be another species very closely resembling this. There are so many species of *Ophelia* known in India under the name of *chiretta*, that the author considers it surprising that one or the other has not before been noticed in European markets as a substitute for the true (officinal) *chiretta*. The substitute above referred to differs from the true drug in forming a much less bitter infusion, and possesses several marked distinctive characters, the most important of which the author has tabulated with the character of the true *chiretta*, as below.

## SPURIOUS CHIRETTA.

*Stem* obscurely quadrangular below, its four angles being each marked by a somewhat prominent border or ring, and very evidently quadrangular and winged above.

*Leaves*, when present, sessile, narrow, and tapering to each end; that is, somewhat lanceolate in outline.

*Scars* left by the fallen leaves not very prominently marked, in consequence of the slight and comparatively narrow attachment of the leaves.

*Flowers* arrayed in loosely aggregated clusters or cymose panicles. Flowers also larger and longer than those of true *chiretta*.

*A transverse section of the stem* exhibits a comparatively thick, woody ring on the outside, and with the centre hollow, or presenting but faint traces of pith attached to the inner surface of the ring-wood.

## TRUE CHIRETTA.

*Stem* round below and throughout nearly its whole length, and very faintly quadrangular above.

*Leaves* embracing the stem, broad at their base, and tapering upwards into a long acute point; that is, ovate or cordate-ovate in shape, and acuminate-pointed.

*Scars* left by the fallen leaves very evident, opposite to each other, and almost encircling the stem.

*Flowers* arranged in less elongated cymose panicles; that is, more compact and more umbellate.

*A transverse section of the stem* exhibits a comparatively thin woody ring, inclosing a large, continuous, easily separable pith, which is yellowish in color.

## ERICACEÆ.

*Kalmia Latifolia*, Lin., has been analyzed by G. W. Kennedy, who finds the leaves to contain, besides gum, tannic acid, lime, and iron (incidentally noticed), *arbutin*, which is, however, not present in as large quantities as in *uva ursi* leaves. The process for the isolation of *arbutin* was that of Kawalier, which, while a good one, he recommends to modify by the substitution of basic acetate for the neutral acetate of lead, whereby the gum and coloring matter are more effectually separated. Kawalier's process consists in treating the decoction with acetate of lead, filtering, treating filtrate with sulphuretted hydrogen, again filtering, and evaporating, and allowing to stand for some time, when *arbutin* will crystallize out. Kennedy found that when the solution was concentrated too far no crystals would separate. He had evaporated it to the consistence of a soft extract. A. J. Ph., Jan. 1875, p. 5.

## COMPOSITÆ.

*Liatris Odoratissima*, Willd.—The large consumption of the deer-tongue, or southern vanilla, according to Dr. A. W. Miller, as a flavor for tobacco, seems to destine the leaves of this plant to become a commercial staple of some importance. The odor of the leaves resembles that of tonka beans, and is due to coumarin. Dr. Miller regards the leaves as an excellent adjunct to the perfumers' art, and recommends a number of preparations, tincture, extract (perfume), and sachet powders, the formulas for which will be found elsewhere in this report. It is said to be used in the South for the purpose of preserving clothing, etc., from the attacks of moths. A. J. Ph., March, 1875, p. 116.

A correspondent of the American Agriculturalist furnishes some account of this plant, an extract from which appears in "The Garden," and from that in Pharm. Jour. Trans. (Dec. 19th, 1874, p. 490). In connection with Dr. Miller's paper, the following is of interest: The wild vanilla, or deer-tongue,

etc., grows abundantly on the edges of what are called "bayo," i. e., low places in the pine woods, which are partially covered with water and overgrown bays (a species of magnolia), or on low, swampy pine woods in East and South Florida, and in portions of lower Georgia. The fresh leaf has, when crushed, a greenish, disagreeable odor, but, when pulled from the plant and dried in the shade for a day or so, it becomes highly fragrant, similar to but much stronger than that of sweet-scented vernal grass. Coumarin is so abundant in the *Liatris*, that it is often found in large quantities on the upper portions of a mass of the semi-dried leaves. The dried leaves furnish an article of commerce, and one that is steadily growing in importance. It is gathered principally along the St. John's River and its tributaries, and sold to the country storekeepers at the rate of three to six cents per pound in exchange for goods. 150 to 400 pounds of the green leaves, which lose from 80 to 85 per cent. in drying, are readily gathered by adults, and active boys and girls may readily gather nearly as much. It is packed in bales of 200 pounds each, Pilatke, on the St. John's River, being the headquarters in this trade.

*Chamomile*.—Several acres are devoted to the cultivation of chamomile at Mitcham, the double-flowered kind being preferred on account of the weight of the product; but both single and double sorts are grown. In March, old and somewhat "spent" plantations are broken up, and the plants divided into good-rooted slips, which are planted in well-prepared ground, in rows two and a half feet apart and two feet asunder in the rows. A common practice, however, is to plant as thick again as this, and to thin out afterwards to the distances just named. The plantations are intercropped with lettuce in spring. As soon as the blooms begin to expand, they are fit for gathering, and from that time, as long as they yield sufficiently to pay, the flowers are gathered several times in the season by women, who are either paid a regular day's wages, or a penny, or thereabouts, per pound for picking. Pharm. Jour. Trans., September 5th, 1874, p. 182; from The Garden.

*Chamomile Flowers* abound, according to Landerer, in im-

mense quantities in Greece, where, in the neighborhood of Athens, they are gathered by girls and women, and are sold in their fresh condition at a merely nominal price. A competent herbalist could make his fortune by collecting this and other aromatic drugs which are found in profusion. N. Rep. Ph., No. 6, 1874, p. 374.

*Arnica*.—A case of poisoning by tincture of arnica, with fatal results, is noted by Wilms. The quantity which had been taken, by an adult, was 60 to 80 c.c. Wilms examined a portion of the tincture by concentrating it, shaking the extract with chloroform, and evaporating the chloroformic solution, and obtained a greenish-yellow residue, which produced, when applied to the upper part of the arm, a papulous eruption. He repeated the experiment with a tincture made from good arnica flowers, and obtained even more decided results, a blister forming on the fourth day, identical with such as is produced with cantharides. He ascribes this action, and consequently the poisonous qualities of arnica flowers, to the substance which Walz has described as "arnicin." Ph. Centralhalle, 1875, No. 24, p. 199.

*Pyrethrum Roseum*.—In view of the inferior quality of the Persian flowers (?), a writer in the Pharm. Post suggests the cultivation in Germany, believing that a more active flower could be thus obtained. The seed is sown in May, and the plant will attain considerable size by autumn, but will seldom flower before May or June of the second year. Insect powders prepared from the flower cultivated in Europe are found exceedingly active. The cultivation of the plant requires no more care than does the chamomile, and the yield of flowers is abundant. Ph. Centralhalle, No. 3, 1875, p. 22.

*Insect Powders*.—According to the experiments of Kalbruner, four grains of a good insect powder sprinkled upon a fly contained in a vial must produce stupefaction in one minute, and death in two or three minutes. So tested, the flowers of *Chrysanthemum leucanthemum*, L.; *C. coronarium*, L.; *Anthemis arvensis*, L.; *A. cotula*, L.; *A. tinctoria*, L.; *A. nobi-*

lis, L.; and *Inula pulicaria*, L.; and the herb of *Pyrethrum roseum*, M. B.; and *P. cinerariæfolium*, Trev., were found quite worthless. The flowers of *Tanacetum vulgare*, L., and of *Pyrethrum corymbosum*, L., produced slight stupefying effect. The flowers of *Pyrethrum parthenium*, L., and of *P. inodorum*, L., stupefy flies and kill them in from one to two hours; their value as insecticides is therefore very slight. The author found that a few of the commercial insect powders came up to the requirements above mentioned, while others require fifteen to thirty minutes to kill a fly. *Zeitschr. Oest. Apoth. Ver.*, 1874, No. 29.

*Kleinia Pteroneura*, D. C.—The curious cactus-like stems of this composite plant are used in Morocco for “pains in the hands and feet” (rheumatism?). The drug is known as “Sabardo, or Asbardo,” and is described by Leared and Holmes as follows: “The stem is about the thickness of the forefinger, leafless, except at the top, where there is a rosette of leaves, furrowed externally, and has a large discoid pith; the branches are nearly equal in size, quite erect, and parallel with the stem, and remind one of a candelabra with a number of candles in it.” *Ph. Jour. Trans.*, January 2d, 1875, p. 521.

*Atractylis gummifera*, L., yields, in Greece, a gummy substance, which is gathered, formed into larger lumps, and is used as a chewing gum. It is known as *Mastix-Ankathi*, and, according to Landerer, is used to some extent to adulterate mastic. For this purpose the tears are coated with finely powdered mastic, and can thus not be distinguished by their physical appearance. It is, however, readily detected by alcohol, in which this gum-resin (containing bassorin) is insoluble. The root of the plant producing this adulterant seems to possess poisonous properties. *N. Rep. Ph.*, No. 7, 437.

*Cynara*.—The leaves of the common artichoke are highly recommended by Dr. Copeman in the treatment of rheumatism, but, to be potent for this purpose, they must be collected at the proper time, which is just before the top of the vegetable is fit for food, and whilst they are full of juice. He recom-



mends it both in form of tincture and extract. The Practitioner (Lond.), February, 1875, p. 129.

#### RUBIACEÆ.

*Cinchona* or *Chinchona*.—Mr. Clements R. Markham, in a recently published "Memoir of the Lady Ana de Osorio, Countess of Chinchon," has revived the discussion of a question which, so far as preponderance of practice can determine anything, might now be supposed to have been satisfactorily settled. It is whether the orthography, *chinchona* or *cinchona*, should obtain for this now famous genus. Mr. Markham sums up his arguments by stating that all authorities agree that *chinchona* is correct, and that consequently *cinchona*, *cinchona*, and other forms are wrong; that the object sought, of commemorating the services of the Countess, is defeated by the mutilation of her name; that in much of the most important literature of the subject the word is spelt *chinchona*, and lastly that "the correct spelling should be universally adopted because it is right." Linnæus, in naming the genus, doubtless sought to connect with it the name of the lady who is reputed to have first made the healing virtues of the bark known in Europe, and Mr. Markham thinks that not being well acquainted with the lady's name, he obtained his knowledge of the Countess of Chinchon through French sources, and was thus misled into calling the genus *Cinchona* in the "Genera Plantarum" of 1742.

On the other hand, it has been contended that Linnæus purposely omitted the *h* for the sake of euphony, and that the law of priority must obtain. Mr. Hanbury has taken the opportunity to investigate the introduction by Linnæus of the genus *Cinchona*, and has pointed out that the misspelling of the name of the Countess occurs in several authors much earlier than Linnæus. He also proves that Mr. Markham is far from correct in asserting that the Spanish botanists, one and all, support the mode of spelling advocated by him (Mr. Markham); but that, on the contrary, Mutis as well as Ruiz and Pavon, follow the orthography of Linnæus. Mr. Hanbury, in the Athenæum of the 28d January (1875), fur-



nishes abundant evidence in support of his position, and while he concedes that *chinchona* much better commemorates the Countess of Chinchon than does *cinchona*, yet he believes with Dr. J. E. Smith (author of "Introduction to Botany," 1807), that "in our science the names established throughout the works of Linnæus are become current, nor can they be altered without great inconvenience;" and he therefore advocates that the orthography *cinchona* should be retained. Ph. Jour. Trans., February 13th, 1875, p. 646.

*Cinchona Culture in India.*—From a report on the progress and condition of the Eastern (British) empire, it appears that the cinchona plants are widely distributed in India, and what was an experiment fifteen years ago must now be regarded a success. It is remarkable also that these results have been obtained at an expense to the government of not exceeding £70,000. The government plantations, on the Neilgherries, cover an area of 950 acres, and contain 2,645,373 plants. A private plantation at Balmadies, of sixty acres, contains splendid trees, and yielded last year (?) a fine crop of bark, which realized, in London, good prices. Two other plantations, covering some 1000 acres, are reported in the same locality, although not in as advanced a condition. At Mercara, in Coorg, and on the Barbabudin hills, in Mysore, there are also plantations. At the well-known Rungbee some 2000 acres are under cultivation, and good prices have been realized for some of the bark there produced. In British Birmah there are various plantations at an elevation of 3700 feet above the sea; in one plantation 300 to 400 trees are now well established. The cinchona trees are said to cover the slopes of the mountains which overhang the Wynaod, and line the hillsides, almost to the peak of Dodabetta.

A febrifuge alkaloid was prepared by Mr. Broughton, in 1873, from the green barks, and it appears that Mr. Wood, the present quinologist, continues the production of a cheap form of alkaloid. The great problem to solve is said to be the discovery of the cheapest form in which an efficient febrifuge can be manufactured from bark; and there is every reason to

expect that valuable results may be announced from Mr. Wood's labors. Ph. Jour. Trans., Feb. 1875, p. 663.

*Indian Barks.*—The chemical examination, by J. E. Howard, of four samples of the bark of *Cinchona officinalis*, among which a sample of root-bark, recently received in England from Ootacamund, proves them to be very rich in alkaloids, and especially in quinia. The author designates them respectively as (A) (B) (C) and (D); (A) presenting specially the characteristics of the sort called *crispa*, at Ootacamund, but appears to be wholly unlike the *crispa* of Tafalla, described by the author in his "Nueva Quinologia." (D) represents the root-bark.

(A.) Quinia, 4.70; cinchonidia, 0.90; quinidia, 0.30; cinchonia, 0.59. Total, 6.40 per cent. of alkaloids.

(B.) Quinia, 4.10; cinchonidia, 1.30; quinidia, 0.10; cinchonia, 0.20. Total, 5.70 per cent. of alkaloids.

(C.) Quinia, 3.20; cinchonidia, 1.00; quinidia, trace; cinchonia, 0.10. Total, 4.30 per cent. of alkaloids.

(D.) About 6 per cent. of mixed alkaloids, largely quinia.

In a former examination the author had expressed the belief, that "the old original *crown bark*, the fine Loxa of Urutusinga, was one which well merited its character on account of the quantity of alkaloids contained." This supposition is now verified; the old crown bark reappearing in all its original richness in the government plantations in India. Ph. Jour. Trans., June 19th, 1875, p. 1005.

Recent importations of the "renewed" bark of *Cinchona succirubra* from three different plantations in the Neilgherries, have enabled Mr. Howard to confirm an observation, made by Dr. De Vrij, of the presence of quinidia in these renewed barks; the various samples all containing it in quantities of 0.1 to 0.2 per cent. The bark of the same species from the same plantations, grown either exposed or under moss, has in no case yielded this alkaloid by similar tests. Another curious example of the effect of the circumstances of growth in modifying the production of this alkaloid is afforded by the *C. officinalis* of the same plantations: a sample of the root-bark of this species gave as much as 0.8 per cent. of quinidia,

while the stem-bark of the same trees yielded only 0.13 per cent. A sample of "renewed" bark of *C. officinalis* from another plantation gave 0.2 per cent., and the "natural" bark of the same plantation only 0.04 per cent. of this alkaloid. Ibid., June 26th, 1875, p. 1025.

*Cinchona Culture in Madeira.*—According to a letter received by Dr. Hooker from Madeira, the climate of that island seems to be especially adapted to the culture of *Cinchona succirubra*. A specimen, planted two years and a half ago, in a garden, at an elevation of five hundred feet above the sea, is now nearly twenty feet high, and blossoms freely. *C. condaminea* does not appear to succeed so well; some plants sent from Kew, six years ago, have been increased by cuttings, but these are reported to be making but little progress. Ph. J. Trans., April 17th, 1875, p. 835, from Gardener's Chronicle.

*Cinchona Culture in St. Helena* had been partially abandoned, but, according to a St. Helena paper, seems to have been resumed with increased confidence of success. The plantation is not to be confined to one locality as heretofore, but the trees are to be tried in various situations. The favorable opinion of Mr. Oswald Reade seems to have given the incentive to renewed attempts. The island seems to be best adapted to the cultivation of red cinchona. Ph. Jour. Trans., Oct. 17th, 1874, p. 305.

*Cinchona Culture in Java.*—The following interesting extract from the "Report on the Government Cinchona Plantations in Java," is taken by the Ph. Jour. Trans. (Oct. 10th, 1874) from the Pharm. Zeit. (Sept. 16th, 1874). The report is for the second quarter for the year 1874.

"Although the abundant rains that have fallen were not unfavorable to cinchona culture, they have checked the field work, and rendered difficult the collection and drying of the bark, so that the harvest commenced in May was carried on slowly and with difficulty. Nevertheless 9000 kilograms of bark are already collected, and everywhere preparation is made to carry on the collection energetically as soon as the dry weather sets in. Through free labor the gathering be-

comes more and more difficult; in fact, the wages will probably become a very important item.

"The fructifications of *C. Calisaya Ledgeriana* have as yet yielded only a few seeds, and have been disappointing, some of the finest specimens having flowered unproductively. Extraordinary care and attention was, therefore, devoted to the artificial production of the superior kind, and better results were obtained. Within eight months nearly 13,000 *C. C. Ledgeriana* plants were obtained from slips, whilst 5400 have already been planted out.

"Through the thinning out of the original plantation of 1866-7, 750 trees of *C. C. Ledgeriana* were sacrificed, and thereby 1500 kilograms of fine bark were obtained, which also was very rich in quinia. The larger gross product which is obtained when more light and air are afforded to the plants has been again very clearly demonstrated by this collection. At Riung-gunung the trees are planted at a distance of from 6 to 7 feet from each other; at Tji-bürrüm, at a distance of from 4 to 5 feet. The average production of each tree in the former establishment was four kilograms, including the root-bark, against one kilogram at Tji-bürrüm.

"The chemist on the cinchona plantations continues his experiments upon the various kinds of cinchona grown under different conditions and of different ages. His results show that among the smaller varieties of *C. Calisaya* also there is an increased richness in quinia; so that there is well-grounded expectation that a large portion of this year's collection from *C. Calisaya* plants will yield a product especially suited for the quinine manufacturer."

Owing to the low price realized for ordinary bark, while the bark powder and manufacturers' bark realized enhanced prices, the experiment is to be made to bring the bark, suited solely for pharmaceutical purposes, into the market in larger quills and sticks. Probably its value will thereby be enhanced, because in pharmacy its worth is estimated more from external appearance. (!)

*Cinchona Calisaya in Java*.—O. Hesse states as a remarkable circumstance connected with the cinchona cultivation in

Java, that the *Cinchona Calisaya* grown there for many years produces an important quantity of *Conchinia*, which is relatively more considerable than in *C. Pitayensis* and other cinchonas. It differs therein specially from the indigenous *C. Calisaya* of Peru and Bolivia, the bark of which contains chiefly quinia, which is generally wanting in the Javanese *Calisaya*. If this difference be considered, together with the fact that a transformation of quinia into conchinia and the reverse, does not occur either in nature or in the separation of these alkaloids from the bark, it may well be questioned whether this Javanese *Calisaya* be the *C. Calisaya* of Vahl or, possibly, a distinct species. The author believes himself justified in assuming the latter view. So far as he can ascertain this species is not new, originating possibly in cultivation and existed in South America prior to the transplantation of cinchonas from thence to Java, and it was evidently on this occasion taken for the true *Calisaya*. Hence, it would naturally follow that the botanical characters of both species are either so alike, or nearly alike, that the one species might be taken for the other, and the only important difference can be sought in the quality of their constituents. The *Cinchona* must not be confounded, however, with that introduced into Java, through Ledger, the *C. Ledgeriana*, which corresponds to the true *Calisaya* bark, in relation to its constituents, and at the present time even exceeds in the amount of quinia it contains.

The amount of conchinia must be looked upon as characteristic of the original Javanese *Calisaya*. De Vrij isolated this alkaloid in 1869 for the first time from the *Cinchona*, and pointed out that what had hitherto been regarded upon as a decomposition product of quinia was no doubt formed by nature. But the evidence was unsatisfactory, because at that time De Vrij knew too little of the properties of the more abundant alkaloids, and thus a confusion with some other alkaloid, possibly with cinchonidia or cinchonine was not impossible. The latter circumstance was referred to in a former communication (1869) upon the alkaloids of *Cinchona*, thereupon De Vrij gave him a specimen of the bark

tion from Tjibodas, that he might make an examination. This he did, by a trustworthy method, with the following result from 100 parts of air-dried bark :

	O. Hesse found	De Vrij found
.Conchinia, . . . . .	8.18	0.50
Cinchonia, . . . . .	0.16	0.15
Amorphous Bases, . . . . .	0.77	8.60
Quinia and Cinchonidia, . . . . .	0.00	
New Alkaloid, . . . . .	0.00	0.06
	<hr/> 4.11	<hr/> 4.81

Ph. J. Trans., December 19th, 1874, p. 482.

To these views and statements De Vrij replies: (1.) That the plant from which the bark in controversy was obtained, really belongs to *C. Calisaya*, Weddell; and he cites as authority for this assertion no less person than Dr. Weddell himself, who had recognized the plants originally introduced in Java. (2.) The bark analyzed by De Vrij in 1869 was *not the same* as that analyzed by Hesse, as he had then used up the bark of several young *Calisayas* which had died, and there was nothing left. Nevertheless, the bark presented to Dr. Hesse a year ago, was Javanese *Calisaya* bark, which had been grown and collected by him at Tjibodas, Java. (3.) While he admits that in 1869 he was much less acquainted with the cinchona alkaloids than now, there was none with which he was so well acquainted as with the alkaloid called "quinidia" by Henry and Delondre, and by Pasteur. In fact, it was at that time the only cinchona alkaloid which he had succeeded in obtaining *chemically* pure. (4.) To a statement of Hesse "that sulphate of quinidia, which really deserves that name, very rarely occurs in the trade," is only true for *Germany*, and, perhaps, also for France; but is not true for England, where it is very readily obtained as an article of commerce; the product of one firm at least having been examined by the author, and found to correspond in its characters and in every other respect, with Pasteur's quinidia and Hesse's conchinia. Ph. Jour. Trans., December 19th, p. 482, and 26th, p. 501, 1874.

*Pharmaceutical Tests for Cinchona Bark.*—In a paper to the

British Pharmaceutical Conference, 1874, Dr. De Vrij proposes a new method of testing cinchona bark. The author remarks that the determination of the total alkaloids in the bark can only be of advantage to the manufacturer of quinia, and that, moreover, the tests usually proposed for this purpose require too much time to be executed in the pharmaceutical laboratory. He also remarks that the physician in prescribing bark evidently intends to apply, along with the alkaloids, the other active constituents of bark, among which cinchotannic acid is preponderant. The relative quantity of this substance in different barks may equally be ascertained, together with that of the alkaloids, in the following manner:

One part of powdered bark is mixed with about 4 parts of distilled water to form a thin semifluid paste, which, after some hours' maceration, is packed in a percolator. When the liquid has percolated, more water is poured into the percolator till 4 parts of clear liquid are obtained.

To apply the test this liquid is divided into 4 parts.

One part is tested by strong hydrochloric acid.

One hundred grains require about 50 minims of acid.

Another part is tested by clear lime-water, which is added till the liquid has a decided alkaline reaction.

These reactions, in applying them to different barks, will, after some experience, enable the operator to judge the pharmaceutical value of the barks, and convince him, for instance, that the Indian barks are in general better adapted for purely pharmaceutical purposes than the American barks.

If the operator wishes also to estimate the relative quantity of the total alkaloids, he may easily do so by testing a measured quantity of the percolated liquid by a standard solution of tannic acid, by which he can compare the amount of alkaloids fit for pharmaceutical use contained in the different barks subjected to his investigation. Proc. Br. Ph. Conf., 1874, p. 484.

*Proximate Analysis of Cinchona Barks.*—R. M. Cotton recommends the following method: The bark is exhausted by maceration with warm water for several days (digestion?), and then percolating; the infusion is acidified with hydro-



chloric acid, then precipitated with caustic soda in slight excess, and the precipitate collected on a filter, and washed with water. The precipitate contains the alkaloids, and the filtrate the acids.

The precipitate is exhausted with ether, which dissolves the quinia and quinidia; the residue, containing cinchonia and cinchonidia, is treated with 90 per cent. alcohol, which dissolves the *cinchonidia*, and leaves the greater part of the *cinchonia*. To the ethereal solution of quinia and quinidia a dilute solution of oxalic acid is added, and it is then evaporated. From the residue water dissolves the oxalate of quinidia, and leaves the oxalate of quinia. The solution is precipitated with aqueous alkali, and the *quinidia* thus determined. The undissolved oxalate of quinia is dissolved in dilute sulphuric acid, from which the *quinia* is likewise determined by precipitation with aqueous alkali.

The solution containing the cinchona acids (kinic, kinovic, and cinchotannic) is treated by the author with normal (?) acetate of lead just short of saturation; the author accomplishing this by completely saturating two-thirds of the solution, and then adding the remaining one-third. Kinovic acid is thus precipitated as kinovate of lead, whereas the kinic and cinchotannic acids remain in solution. The kinovate of lead is suspended in water, and decomposed by dilute sulphuric acid (care being taken to avoid an excess of the latter), the solution is filtered off from the sulphate of lead, concentrated, and allowed to stand some time to crystallize the *kinovic acid*. The filtrate from which the kinovate of lead has been separated is evaporated to crystallization, the crystals are washed with ether, and determined as *kinic acid*. The ethereal solution leaves on evaporation the *cinchotannic acid*.

The author evidently does not aim at more than approximately accurate results. A. J. Ph., Jan. 1875, p. 3.

*Cephalanthus occidentalis*, Lin.—The bark of the buttonbush or pond dogwood, has been subjected to proximate analysis by Mr. Edgar M. Hattan, who has found it to contain a fluorescent crystallizable acid, an uncrystallizable bitter principle, a principle resembling saponin, tannin, two resins, fatty mat-



ter, gum, glucose, and starch. The crystalline principle in its reactions and solubility closely resembled æsculin, but was proved not to be a glucoside. Of the resins, one was soluble in alcohol only, the other both in alcohol and ether. The former was determined to be a glucoside. A. J. Ph., July, 1874, pp. 310–314.

*Ipecacuanha*.—Mr. John Mercer has met with two samples of powdered ipecacuanha, which proved to be adulterated with almond-meal, both samples developing hydrocyanic acid upon infusion in water. Ph. Jour. Trans., 1874.

#### ARALIACEÆ.

*Hedera Helix*.—F. A. Harsten has isolated from ivy leaves a new and peculiar substance, which bears much analogy to saponin, and is probably a glucoside (see Glucosides, in this report). It seems to occur in large quantity, and is most abundant in the old leaves, especially those that have the greatest exposure to the sun. The substance, “Hederin,” by some authors regarded an alkaloid, seems to be simply hederin-tannic acid, of bitter taste. Arch. Ph., April, 1875, p. 299.

#### UMBELLIFERÆ.

*Angelica Root*.—From the investigations of A. W. Miller, it appears that at least three or four different roots are met with in commerce under the name of “Angelica root.” Besides the roots of *Archangelica officinalis*, Hoffmann, the European angelica root, and of *A. atropurpurea*, Hoffm., our American angelica root, the roots of *Ligusticum actæifolium*, *Heracleum lanatum*, and *Imperatoria ostruthium*, seem to be indiscriminately sold as angelica roots. While angelica root is not now officinal, the root of *A. atropurpurea* was officinal in the old editions of our Pharmacopœia; it was discarded in 1860, and *A. officinalis* adopted in its place; and since the root of the latter is now, and has been officinal in the German Pharmacopœias, and angelica is called for chiefly by Germans, the author considers it safest to dispense only the imported root of *Archangelica officinalis*, Hoffm., when angelica root is called for, unless the

root of one of the other plants is plainly specified. A. J. Ph., May, 1875, p. 197.

*Asafoetida*.—A. W. Miller, in a very interesting paper on the orthography of *asafoetida*, demonstrates that the word *asa* is more properly used than the word *assa*. The authorities quoted in favor of the author's view are among the highest. Among the various Pharmacopœias only the British and U. S. Pharmacopœias employ the word *assafoetida*. A. J. Ph., February, 1875, p. 49.

Three varieties of *asafoetida* are commonly met with in the Bombay markets, according to W. Dymock, viz., *Abushahere Hing*, *Kandaharee Hing*, and *Hingra*.

*Abushahere Hing* is the only one of these that is simply called "Hing" (*asafoetida*), all other kinds passing under the name "Hingra." It is brought from the Persian Gulf ports, principally *Abushaher* and *Buuder Abbas*, and is produced in *Khorassan* and *Kirman* from the *Ferula alliacea* of Boissier. It arrives in Bombay either in skins sewn up so as to form flat packages, or in wooden boxes; varies in appearance, according to age, being when fresh of the consistence of treacle, of a dull olive-brown, and a purely garlicky odor; and is mixed with about an equal bulk of slices of the root. After having been kept for some time the gum-resin becomes hard and translucent, and of a yellowish-brown color.

*Kandaharee Hing* is much rarer, and only occasionally met with in the markets, and not retailed in the shops. It comes from *Kandahar* packed in goat-skins, which are sewed up into an irregular-shaped oblong bag, with the hair outside. This *asafoetida*, when fresh, is in flaky pieces, quite wet with essential oil, is yellow in color, opalescent, and an odor like a mixture of garlic and carraway. It loses much of its aroma by age, which then approximates to that of the best *asafoetida* of European commerce, and it becomes dry, transparent, and golden-yellow in color.

*Hingra* is the *asafoetida* of European commerce, and reaches Bombay in large quantities from Southern Persia and Afghanistan. The *Persian Hingra* arrives in skins or boxes, and is met with either in tears, more or less agglutinated together,

or in form of a soft, white, viscid mass. This variety is the *Anghuzeh-i-Lari* of the Persians, and is doubtless obtained from Kämpfer's plant. The *Affghan Hingra* differs from the Persian somewhat in appearance and color, and is generally packed in skins. The best samples occur in small flat pieces, or tears, to one side of which a few particles of sand are adherent, as if the gum had run out into the ground near the root; these pieces are quite hard and dry, yellowish-white externally, and display, when broken, a conchoidal milk-white surface.

*Hing* is adulterated in Bombay. It is simply mixed with gum arabic by treading the two together, and the mixture is then packed so as to resemble the original packages.

*Hingra* is adulterated in Affghanistan and in Persia, by the admixture of some white earthy material. The Persian article is dirty-white and gritty; the Affghan is in small roundish friable masses of a brown color. From an examination of many bales of hingra, the author arrives at the opinion that the Persian variety is obtained from a different plant than the Affghan variety; the former probably *Scorodosma fœtidum*, and the latter, perhaps, Falconer's *Nartherx*. Ph. Jour. Trans., May 29th, 1875, p. 945.

#### RANUNCULACEÆ.

*Actæa alba*, Bigelow.—William Dilmore has subjected the root of the white cohosh to chemical examination. The distillate possesses the odor of the root. In the infusion and decoction he determined albumen, gum, sugar, starch, and extractive. The result of his tests for tannic and gallic acids were negative. From the alcoholic tinctures he obtained two resins, both acrid and saponifiable, but one of them only soluble in ether. After the separation of the resin, by concentrating the tincture and precipitating by water, the filtrate was found to contain a principle analogous to saponin, which the author isolated in an impure condition. A. J. Ph., Feb. 1875, p. 54.

#### MENISPERMACEÆ.

*Chondodendron* or *Chondrodendron*?—Mr. Miers suggests

in his "Monograph on the Menispermaceæ" that the word *chondodendron* was originally misspelt, and should have been spelled *chondrodendron*. Hanbury and Flückiger, in their "Pharmacographia," prefer to write it *chondodendron*, and Mr. Hanbury has since inquired into the reasons that may be urged in favor of each way of spelling, and has found that while the originators of the word, Ruiz and Pavon, derived it from sources which would have warranted them to spell it *chondrodendron*, yet, probably for the sake of euphony, they have doubtless preferred to drop the r, and to write *chondodendron*. This, together with other evidence, prompts Mr. Hanbury to accept the name without any attempt at improvement. It has served for eighty years in botanical literature, and may fairly claim admittance to that of pharmacy. Ph. Jour. Trans., Nov. 28th, 1874, p. 421.

*Bútua*.—A Brazilian drug of this name is described by E. M. Holmes. It consists of a root which corresponds in its structure and taste with true Pareira Brava root, but is of a more yellowish hue than is usual in that drug. A smaller piece, labelled "abutua negra," exactly corresponds with, and is, without doubt, the root of *Chondodendron tomentosum*, R. et P. Dr. Barnsley states that it is used in the form of infusion, extract, and powder, in chronic hepatitis, dyspepsia, etc. But he makes also the extraordinary statement that "this root has a basic salt which unites with sulphuric acid, is white, etc., almost like that of cinchona. It is exported to Europe in great quantities to adulterate quinine." This salt has been examined by Mr. J. Moss, F.C.S., and proves to be *sulphate of quinidia*. Ph. J. Trans., May 15th, 1875, p. 905.

#### RUTACEÆ.

*Pilocarpus Pennatifolius*.—A new medicine, known as *Jaborandi*, has been introduced and experimented with at the Beaujon Hospital, Paris, and is exciting attention on account of its wonderful reputation as a diaphoretic and sialagogue. It is given in the form of infusion, prepared from the leaves and little twigs of the plant, in the proportion of four to six grams

in a cupful of warm water. The infusion, given either cold or warm, excites, in the course of ten minutes after its administration, profuse perspiration, which continues for five to six hours, and which is so thorough as to necessitate several changes of linen. At the same time a most abundant flow of saliva is promoted, so abundant, says Prof. Gubler, who has experimented with it, that speech is rendered almost impossible. Attention was first drawn to the remarkable therapeutic value of the plant by Dr. S. Continho of Pernambuco. Prof. Baillon refers the plant to a species of the rue family, the *Pilocarpus pinnatus*, jaborandi being, it seems, the Indian name. It is said to be found in the interior of some of the northern provinces of Brazil. A. J. Ph., 1874, July, p. 345.

*Jaborandi* has since been subjected to analysis by M. Rabuteau, who also gives it the following physical characteristics: The jaborandi leaves have an odor difficult to define, but which recalls to a certain degree that of dry herbs or hay. This odor, which is faint when the leaves are intact, becomes more manifest when the leaves are bruised. The taste is weak; it is, however, slightly bitter when the leaves are masticated.

From his chemical experiments, it would appear that the jaborandi leaves have an odor due to a volatile principle, which is not analogous to the essential oils contained in aromatic plants. Its bitter taste is due to a principle soluble in water and in alcohol, which can be easily separated by heating the aqueous extract with alcohol. An alkaloid does not seem to be present. The author does not, however, regard his experiments conclusive, in consequence of the small quantity of leaves operated on, and intends to continue his investigations as soon as a further supply of leaves can be obtained. Ph. Jour. Trans., May 16th, 1874, p. 911.

Byasson has since obtained results which seem to prove the presence of both a volatile oil and a volatile alkaloid. A portion of the leaves had been macerated in 90° alcohol for two months (the author's absence necessitating so long a time), and the green filtrate was subjected to distillation. Upon diluting the distillate, turbidity resulted, evidently from

separation of oil, which, in the state of suspension in dilute alcohol, possessed a pungent and persistent taste, but was apparently without medicinal effect. The residue in the still was filtered from a greenish deposit, furnishing a reddish-brown liquid, of slight aromatic odor, which, upon again standing, deposited a brown matter, proving to be a slightly acrid resin, devoid of medicinal action. The addition of lime to a portion of the liquid turned the reddish-brown to a fine yellow color. The whole was evaporated at a temperature below  $60^{\circ}$  C. ( $= 140^{\circ}$  F.), and the desiccated mass exhausted with excess of chloroform, which, upon distillation, yielded a yellow-brown glutinous substance, devoid of crystallinity, but showing under the glass oleaginous particles. By treatment with water, acidulated with sulphuric acid and precipitation of the solution by ammonia, glutinous flocks were obtained, which yielded to ether a viscous aromatic substance and some crystals of sulphate of ammonium. The viscous substance was separated by alcohol, and afforded precipitates with the reagents generally used for alkaloids, particularly by iodo-hydrargyrate of potassium from acid solution. Its taste is quite acrid, with bitter after-taste, and provoked, with the very small quantity tasted, the commencement of salivation without sweating. By subjecting a portion of the brown filtrate, to which lime had been added, to distillation, a distillate was obtained containing abundance of ammonia, possessed also the odor of methylamina or of an analogous base, and yielded to ether a small quantity of the oleaginous and viscous substance, presenting all the characters of the foregoing. Among other substances, not well determined, the author found a considerable quantity of organic acid. The quantity of alkaloid obtained was insufficient to allow of a chemical examination, but the author concludes that the active principle is an alkaloid, liquid, viscous, and aromatic, having an acrid and bitter taste, and, like nicotina, capable of being carried over with the vapor of water by distillation. It is proven to be soluble in chloroform, ether, absolute alcohol, ammoniacal water, and dilute acids. He proposes to name it "jaborandina;" but, in view of the fact that this name has already

been appropriated to the alkaloid obtained by Parodi from the so-called "Paraguay Jaborandi," Mr. Holmes suggests that it be called "pilocarpina." Ph. Jour. Trans., April 17th, 1875, p. 826; from Rep. de Pharm., March 25th, 1875.

*Jaborandi*.—E. M. Holmes has had opportunity to examine a quantity of Pernambuco Jaborandi, among which he has fortunately found several ripe fruits of the plant. These fruits being distinctly *rutaceous* in their character, the conjecture of Prof. Baillon that they belong to that order is confirmed. The plant evidently belongs to the tribe *Zanthoxyleæ*, and is probably a species of *Pilocarpus*, but, although coming very near to *P. pennatifolius*, Lemaire, the author is not prepared to identify it with this species, since it possesses some characters distinctive of a specimen of that plant cultivated at Kew. The specimens of Jaborandi examined by the author appear to belong to a shrub about five feet high.

*The root* is cylindrical, hardly tapering at all, nearly three-quarters of an inch in diameter for the first twelve inches, and very sparingly branched. The bark of the root is about one line in thickness, of a pale yellowish-brown color, and has a very short fracture; the outermost layers being very thin and papery, frequently exfoliated, and under the microscope is found to consist entirely of strongly reticulated dodecahedral cells. The odor of the root is like that of a mixture of bruised pea-pods and orange-peel. The taste, at first like that of green peas, soon becomes tingling, producing a more powerful and persistent sensation than that produced by the leaves or stems. A transversely cut section of the bark exhibits by gaslight a surface sparkling with minute crystals.

*The stem* is half an inch in diameter near the root, narrowing to a quarter of an inch in the upper branches. It has a thin bark of a grayish-brown color, is longitudinally striated, and is sprinkled over in some specimens with a number of white dots, which are the remains of oil receptacles. The bark of the stem is thin and fragile, and readily scales off when the stem is broken or bent; is short of fracture, internally yellowish-white, and sparkling with minute crystals. The wood is yellowish-white, and remarkably fibrous. The

FIGS. 33-43.

1. An entire leaf. 2. Leaflet, under side. 3. Fruit and peduncle, natural size. 4. Two carpels on a deflexed pedicel. 5. Carpel showing dehiscence. 6. Carpellary valve. 7. Endocarp with dilated placenta and short funiculus. 8. Placenta. 9. Seed; a, hilum. 10. Endocarp without placenta. 11. Cotyledon.



stem is alternately branched at a very acute angle (about  $20^{\circ}$ ), the branches being erect and furnished with alternate leaves.

*The leaves*, one of which is represented in No. 1 of cut, are imparipinnate, about nine inches long, with from three to five pairs of opposite leaflets, which are articulated to the rachis, and have very short, slightly swollen petiolules; those of the upper leaflets are about one line long, those of the lowest leaflets about three lines long, and the terminal one has a petiolule from half to one inch long. The rachis of the leaf is swollen at the base. The pairs of leaflets are usually about one and a quarter inches apart, the lowest pair being about four inches from the line of the rachis.

*The leaflets* are variable in size even on the same leaf. Their general outline is oblong lanceolate. They are entire (Fig. 2), with an emarginate or even retuse apex, and an unequal base. Their texture is coriaceous, and when moistened reminds one, in size and thickness, of the leaf of the cherry-laurel. The veins are prominent on both sides of the leaf, and branch from the midrib at an obtuse angle (about  $60^{\circ}$ ) in a pinnate manner, remaining distinct until within a quarter of an inch of the margin of the leaf, where they become lost in the network of veinlets. The midrib is scarcely prominent on their upper, but forms a distinct keel on their under surface; when held up to the light the leaflets are seen to be densely pellucidly punctate. These pellucid dots, which are receptacles of secretions, are not arranged, as in another kind of Jaborandi, in lines along the veinlets, but are irregularly scattered all over the leaf, and appear equally numerous in every part. The whole plant is glabrous.

*The inflorescence* is a raceme, six or eight inches long, judging from the peduncle (Fig. 3). The pedicels, so far as can be learned from the scars on the peduncle, are numerous, and about three-eighths of an inch apart. Whether they are horizontal or not when flowering it is impossible to say. The only two specimens the author has seen are in fruit, and have the pedicel deflexed about half an inch.

*The fruit* (see Fig. 3) resembles in external appearance that of a specimen of a Cuban plant in the British Museum, re-

ferred by Asa Gray to *Pilocarpus heterophyllus*. When perfect it consists of five carpels, of which not more than two or three are usually developed to maturity. When ripe the carpels dehisce into two valves, as in Fig. 5, and then remind one strongly of miniature cockle-shells (Fig. 4), with the valves open exposing the animals. This appearance is owing to the fact that, as in two or three other closely allied genera, the endocarp separates at a very early stage, and thus forms an inner case for the seed, as represented in Figs. 7 and 10. The outer portion of the carpel, consisting of the united epicarp and mesocarp, is in most of the specimens of a pale brown or buff color, coriaceous, convex on both sides, of a somewhat circular form, but with the inner edge (*i. e.*, that nearest to the stigma) nearly straight, marked both inside (Fig. 6) and outside (Fig. 4) with curved ridges, which anastomose toward the outer edge, and are almost absent from the inner edge. The convex surfaces only are dotted with oil-receptacles. The endocarp (Fig. 10) is smooth and pale yellow, with a wide sinus in the inner edge, which is occupied by a membranous expansion (Fig. 7) of the shape shown in Fig. 8. To the upper portion of this expansion, which appears to be a dilatation of the placenta, the seed (Fig. 9) is suspended by a narrow, lancet-shaped, extremely short funiculus; this is shown in Fig. 5. The seed, of which there is only one in each carpel, is black, shining, somewhat reniform, convex on both sides, enlarging towards the base, and forming a sharp ridge at the back towards the apex. The hilum is lancet-shaped, the vessels appearing to pass through its lower end (Fig. 9a). The testa is thick and coriaceous, the endopleura membranous. The seed is inverted, somewhat reniform in outline, with a superior radicle, plano-convex cotyledons, and is ex-albuminous, the radicle being very minute (Fig. 11).

The Jaborandi plant differs from the description of the genus *Pilocarpus*, as defined in the "Genera Plantarum," only in the following particulars: The seeds are somewhat reniform, not ovate, and the testa is coriaceous, not membranaceous. The cotyledons are not auriculate, but this is not alone sufficient to exclude the plant from the genus. Since

there are several genera closely allied to *Pilocarpus* in the tribe *Zanthoxyleæ*, it will not be possible until the flowers of the Jaborandi plant have been examined, to decide whether or not it belongs to the genus *Pilocarpus*. As there are several plants used in South America under the name Jaborandi, the author thinks it well in future experiments to distinguish the Jaborandi above described as "Pernambuco Jaborandi." Ph. Jour. Trans., January 23d, 1875, p. 581.

For a further note on the same subject see the same journal, February 13th, 1875, p. 641.

The remarkably diaphoretic and sialagogue virtues of Jaborandi seem to be well established, the testimony of all of the various experimenters being to that effect. A paper on its physiological action by Mr. Martindale, and the remarks on Jaborandi by Dr. Craig, at a meeting of the Pharmaceutical Society, will be read with interest, in Pharm. Jour. Trans., January 16th, 1875, pp. 561 and 574.

A. W. Gerrard has made experiments with both the bark of the stem and the leaves of Jaborandi, and has likewise obtained as active constituent a small quantity of soft aromatic substance possessing alkaloidal properties. He had selected the bark of the stem, because the chlorophyll in the leaves had made it very troublesome to separate the active principle; but this difficulty he has overcome, and he recommends the following method for separating the alkaloid from the leaves or bark: Prepare a soft extract with 50 per cent. alcohol. Digest this with water, filter and wash. Evaporate the filtrate to a soft extract, cautiously add ammonia in slight excess, shake well with chloroform, separate the chloroform solution and allow it to evaporate; the residue is the alkaloid, which the author names "pilocarpina," and contains probably some impurity. It is active in half-grain doses. The bark contains also an acrid resin, devoid of the medicinal effect of Jaborandi, and obtained as residue from the above-mentioned extract, when this is treated with water. Jaborandi also contains resin, volatile oil, and chlorophyll. Ph. Jour. Trans., May 1st, 1875, p. 865.

Since communicating the above, Mr. Gerrard has succeeded

to obtain the sulphate and nitrate of pilocarpina in a crystallized state. From solution in hydrochloric acid he did not succeed in obtaining crystals so readily, but this, finally, was also obtained in a crystalline condition. Physiological experiments made with the nitrate, prove it to possess in a high degree the activity of Jaborandi. One drop of a solution containing one grain of the nitrate of pilocarpina to the fluid ounce, was capable of producing remarkable contraction of the pupil of the eye. Ph. J. Trans., June 5th, 1875, p. 965.

*Paraguay Jaborandi*.\*—D. Parodi describes a plant, which in Paraguay is medicinally employed by the Indians, and is known by them under the general term of *Yaguarundi*; a term applied also to other plants in the Guarany tongue, to several of the *Rutaceæ*. The true *Yaguarundi*, however, belongs to the *Piperaceæ*, and is regarded by the author to be *Piper Jaborandi*, Velloso. The leaves, tops, and roots of the plant act as a sialagogue and diaphoretic, and are, for this reason, used by the Indians against the bites of venomous reptiles, the juice being applied to the wound, and the infusion freely taken internally.

The author has subjected the leaves and spikes containing flowers and unripe fruit, to chemical examination, and obtained a *volatile oil*, having an acrid and biting taste, and yielding with hydrochloric acid gas a crystalline compound. From the aqueous decoction in the retort he obtained an *alkaloid*, which is crystalline, readily soluble in amylic alcohol and benzin (benzol?), but slightly in dilute acids, having a weak affinity for them, slightly soluble also in ether, and of composition corresponding to the formula  $C_{10}H_{12}N_2O_3$  ( $O = 16$ ). The author has named it *Jaborandina*. Am. J. Ph., May, 1875, p. 214; from Revista Farmaceutica, Buenos Aires, January, 1875.

*Angustura Bark*.—P. Cazeneuve has been engaged in a microscopical investigation of the physiological characteristics presented by true angustura bark and that of *Strychnos nux*

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\* This properly belongs to the *Piperaceæ*, but for obvious reasons is placed here.—C. L. D.

*vomica*, and also of the variations in their behavior when treated with nitric acid. If a transverse section of true *angustura* bark, cut as thin as possible, be moistened with a little glycerin and examined under the microscope, irregularly scattered groups of much-thickened cells will be seen. The false bark, examined under the same conditions, presents two distinct zones of these sclerogenous cells, which are entangled with one another, as may be seen in sections cut in various directions. The examination may be carried further, by taking a very thin tangential section, cut perpendicularly to the medullary rays, placing it upon an object-glass, and moistening it with a small drop of distilled water in such a manner that the water overflows the tissue but very slightly when compressed by the upper glass. With a magnifying power of 270 diameters, grains of starch may be seen in the cells of the liber parenchyma; and here and there, in the same tissue, large ovoid cells filled with acicular raphides consisting essentially of oxalate of calcium (see A, Fig. 44). There are

FIG. 44.

also groups of rounded cells, the appearance of which recalls the appearance of a perpendicular section of the medullary rays in the woody tissue of dicotyledons in general. These groups of cells (see B, Fig. 44) contain a granular substance, soluble in alcohol, ether, and acids, and insoluble in alkalis and in water (cusparin?). If, by means of a glass rod, a drop of nitric acid be applied round the edge of the

glass, the acid by capillary action will spread between the two plates of glass to the narrow zone of water which surrounds the tissue, will spread into the tissue, dissolve the oxalate of calcium, and, when it reaches the granular substance (cusparin?), dissolves this with evolution of gas, and forms a red liquid, which finally disappears with excess of acid. In the false angustura bark, under the same conditions, a uniform red coloration is formed, which, owing to the solubility of brucia in water, is already evidenced when the acid comes in contact with the aqueous zone. A thin section of the suberous layer of true angustura bark is not colored by the action of nitric acid, while the suber of false angustura bark presents rounded cells, empty of contents, and colored a beautiful green on the sides, which gradually passes to yellow. Ph. Jour. Trans., July 4th, 1874, p. 7; from Rép. de Pharm.

*False Angustura Bark.*—Oberlin and Schlagdenhauffen state that in a large number of pharmacies of the department of Meurthe et Moselle, and in French drug stores generally, a bark is met with, the physical and organoleptic characters of which correspond completely with those described by Professor J. M. Maisch in Am. Jour. Pharm., February, 1874, p. 50. They have been occupied in studying the bark since the close of 1873, and report the same to be derived from *Esenbeckia febrifuga*, Martius, s. *Evodia febrifuga*, Saint Hilaire, tribe Pilocarpææ, nat. ord. Diosmaceæ. The tree is very abundant in the province of Minas Geraes, Brazil, where it is known as *Tres folhas vermelhas* or *Laranjeiro do mato*. The bark is highly esteemed as a tonic, febrifuge, and antidysenteric, and is called by the natives *China Piavi*, *China du Brésil* (Brazil bark). The authors have discovered in this bark an alkaloid which they promise to describe hereafter. A. J. Ph., September, 1874, p. 414; from J. de Ph. et de Chim., August, 1874.

*Ailanthus glandulosa*, Desf.—The bark of the root is attracting attention in France, as a remedy for dysentery, for which purpose it is successfully used by Chinese physicians. It is a white bark when fresh, acquires a grayish tint on drying, is

fibrous and loose in texture, and is almost without odor. Its infusion, however, has a slightly nauseous odor and an extremely bitter taste. By the Chinese physicians it is used in the fresh state only; but Dr. Roberts, who addressed an official note on the subject to the inspector-general of the health service in the French navy, has used it in the dry state with no perceptible difference in the action of the two states. For administration, 50 grams of the fresh root is cut into very small pieces and triturated with 75 grams of hot water for a few minutes in a mortar, in order to soften the bark, and then strained. A teaspoonful of this strong infusion is administered, either alone or in a cup of tea, morning and evening. Taken in this way it is apt to nauseate. Ph. Jour. Trans., May 9th, 1874, p. 890; from Rép. de Ph.

#### LINACEÆ.

*Flaxseed*.—Oil-cake, which in some parts of Europe is largely used as food for cattle, has been found by A. Vigener to contain a large percentage of ricinus seeds. Attention had been first drawn to the subject by the fact that cattle, which had been fed with the linseed meal, were attacked with symptoms of poisoning, manifested by loss of appetite, profuse diarrhoea, etc. In the case of milch-cows the yield of milk was remarkably diminished. The author details the method of his examination. Arch. Ph., June, 1874, pp. 495–506.

#### MALVACEÆ.

*Malva Parviflora*, L.—The whole herb is used in Morocco as a demulcent in catarrh, and is known as “Khobaizeh.” Under this name, however, other species of the Malvaceæ seem to be designated, since a specimen has been met with by Leared and Holmes, under this designation, which proved to belong to *Lavatera hispida*, Desf. Ph. Jour. Trans., January 2d, 1875, p. 521.

*Hibiscus esculentus*.—The attention which is now being prominently directed in France to this plant as a paper-making material, has induced a writer, in Journal of Applied Science,



February, 1875, to give some general information on this and other species of *Hibiscus*. The young pods of the plant are used as a vegetable, under the name of Ochro, Gombo, etc. The seeds (of the ripe pods?) contain a considerable amount of mucilage, oil, etc., and may be used as food, like barley. According to an analysis of E. Laudron the seeds contain 4.21 per cent. of water, 16.50 per cent. of oil of disagreeable flavor, but useful as a soap material, 1.21 per cent of resin, 6.38 per cent. of mineral matters; the remaining 71.70 per cent. being undetermined. The oil-cake, remaining after the expression of oil, contains 4.18 per cent. of nitrogen, and 1.55 per cent. of phosphoric acid, and would be a valuable manure. The stems contain 60.75 per cent. of cellulose, which, in the form of the natural fibre, is very readily separated, solely by mechanical means, and furnishes, when reduced to pulp, washed, and bleached, a paper equalling that prepared from pure rags. The stems also contain 19.50 per cent. of mucilage (called gombin), the greater part of which may be recovered from the washings of the fibre, and utilized in pharmacy, etc. Besides these they contain 0.93 per cent. of resin, 4.75 per cent. of mineral matter, and 13.82 per cent. of water. The plant has long been introduced in India.

*H. Sabdariffa*.—The sorrel plant is cultivated in most gardens in South Africa and India. Its calyces, as they ripen, become fleshy, and being of a pleasant acid taste are much employed for making tarts and jelly. A sweetened and fermented decoction is used, called "sorrel drink," in the West Indies. The root is said to be purgative; the leaves are used as salad. The stem possesses a fine silky fibre.

*H. cannabinum* —The bark yields the Deckanee hemp. It is full of strong fibres, which are worked into cordage, and might, with proper care, be worked into good, fine thread of any size. The plant is as much cultivated for its leaves, which are acidulous and eatable, as for the fibre.

*H. furcatus*.—The bark yields an abundance of strong white fibre, but not so tough and tenacious as the hemplike *Hibiscus*.

*H. rosa sinensis*.—The plant is valued in China chiefly for



its flowers, which are not only used in garlands, festoons, etc., but are used for a variety of domestic purposes. The petals communicate to paper a bluish-purple tint, which forms an excellent substitute for litmus-paper. The bark furnishes a beautiful bast, strong, white, and flexible.

*H. elatus*, Lin., furnishes the Mahoe fibre, and the *H. trilobus*, Sev., furnishes a good brownish flax. A. J. Ph., March, 1875, p. 120.

*Gossypii Radicis Cortex*, of the United States Pharmacopœia, is described by Prof. J. M. Maisch as follows: The woody, conical, nearly simple root of the cultivated cotton plant is covered with a thin bark, about half a line to one line in thickness, rarely thicker. Externally, the bark is of a brownish-yellow color, with larger irregular patches of a brownish-orange, caused by the abrasion of the outer layer of cork, and smaller ones more scattered, of a nearly black color. The yellowish portion has a slight satiny lustre; the other parts are dull. The thin, corky layer, which adheres well to the bark layer, forms shallow longitudinal ridges, often becoming confluent into narrow, elongated meshes. Suberous warts, or their scars, are scattered over the surface, at first circular in shape, ultimately forming short transverse black lines. The inner surface is of a whitish or reddish-white color, a silky lustre, and finely, but to the naked eye, distinctly striate in a longitudinal direction. A pocket lens reveals these striæ as thin, medullary rays penetrating into the bark. The bark fibres are long and tough, and arranged in tangential rows, on account of which the inner bark may be separated into very thin, almost transparent layers without difficulty. The bark is without odor, and possesses scarcely an acrid taste; the corky layer is in the main rather feebly astringent.

The author has met with a so-called cotton-root bark, which is so entirely different from the root-bark of the cultivated gossypium, as to leave no doubt whatever in regard to its origin from a different plant.

*The fictitious bark* consists of quills or curved pieces, several inches to a foot or more in length, and one-eighth to one-fourth inch in thickness; inodorous, of slight astringent, after-

wards bitterish and distinctly acrid taste; pale-brown to rust-brown throughout in color, and destitute of silky lustre, except the bast fibres upon a fresh fracture. The exterior bark is deep-brown; the younger bark with shallow, longitudinal, suberous ridges; the older bark with the soft cork more or less fissured, and exfoliating in small patches. The interior bark is of a dark-brown or blackish-brown color, and striate by the rather coarse bast fibres. The bark breaks transversely with little difficulty, and exhibits a coarse splintery fracture from the numerous bast fibres, which are dispersed in tangential rows; the inner bark separates in the same direction in rather thick layers. The author supposed that this substitute might have been derived from some species of *Populus*, several of which, particularly *P. angulata*, Aiton, *P. monilifera*, Aiton, and *P. heterophylla*, Linn., are popularly known as cottonwood trees, on account of the cotton-like filaments found in the fruit. He has reason to suppose that a considerable portion of the commercial fluid extracts of cotton-root bark have been made from this substitute, and the question therefore presents itself, to which cotton-root bark the reputed emmenagogue properties must be ascribed. A. J. Ph., January, 1875, p. 11.

The root-bark of *P. monilifera*, however, does not resemble the false bark described above. Ibid., p. 87.

#### BYTTNERIACEÆ.

*Oleum Theobromæ*.—The usual method of its purification, filtration, may be dispensed with, according to Hirschberg, if the raw cacao butter is melted with water in a cylindrical vessel, is then thoroughly agitated with the water, which is kept at a gentle heat, until the melted oil appears clear. It is then allowed to cool, the sides of the vessel are gently heated, the cylindrical mass is removed, and the lower impure portion detached with a warmed spatula. In the author's opinion a grayish sediment, which forms on the surface of the cacao particles, is the cause of the color of the oil. Arch. Pharm., February, 1875, p. 148.

#### TERNSTRØMIACEÆ.

*Thea Viridis*.—M. André Leroy, an extensive cultivator of

the camellia in Anjou, has endeavored to introduce the tea plant in France, and has succeeded, by grafting on the camellia stocks, to raise some four or five hundred tea plants from *Thea viridis*, which are now from eight to ten years old. The extreme branches bear flowers and fruit annually, if the temperature has not been too cold. Unfortunately the tea, made from the prepared leaves, has really no taste of tea, and M. Menière has found them to contain but a small quantity of thein. He has also found them to contain tannic, gallic, and oxalic acids. Ph. Jour. Trans., June 20th, 1874.

#### AURANTIACEÆ.

*Citrus*.—For some years the various species of citrus, orange, lemon, bergamot, etc., cultivated in Sicily, have been affected by a peculiar disease, which, according to Augustin, has, during the past year, reached such proportions, especially in Messina and Palermo, that the Italian government has taken steps to discover the cause, and to prevent the spreading of it. This accounts for the steady rise in the price of the oils of lemon and of bergamot, which will doubtless remain high for some time to come. The observations and experiments of the commission have determined that the lemon trees are the most, while the orange trees are the least affected by the disease. This is first observed by a remarkable yellowing of the leaves; then dark spots appear on the bark of the lower part of the trunk; the bark becomes soft on these spots, as does also the wood beneath, and frequently an unpleasantly odorous liquid exudes. The spots increase, form a ring around the trunk, and the tree dies, as a rule, after a few months. The origin of the disease is ascribed to the profuse manuring and irrigation resorted to, in order to insure a very large yield of fruit. Ph. Centralhalle, No. 39, 1874, p. 327.

*Bitter Orange-peel*.—The bitterness of the bitter orange-peel is, according to Dr. Richard H. Stabler, due to a bitter extractive, which is named *aurantiin*. It is retained in the mother liquors from which *hesperidin* has crystallized. Auranthin is very soluble in water or dilute alcohol, less soluble

in strong alcohol, insoluble in ether, chloroform, purified benzoin, or oil of turpentine. It is remarkable that its bitter taste is destroyed by acetic acid. See Proceedings, 1874, p. 390.

#### VITACEÆ.

*Wines.*—According to E. Duclaux, wines when sound contain acetic acid in slight amount, mixed with about one-twelfth or one-fifteenth of butyric acid. Valerianic acid is found in quantities not exceeding 10 milligrams per litre, and a higher fatty acid in almost infinitesimal proportions. When wine is affected with the disease known as "*tourné*" or "*pousse*," acetic and metacetic acids are developed in about equal proportions, and to the amount of 2.5 or 2.6 grams per litre. In the disease of bitterness, acetic acid is developed, along with butyric acid, and traces of a higher fatty acid, the amount of butyric acid being larger than is formed in alcoholic fermentations.

The author points out the means of distinguishing the coloring-matter of wine from three substances frequently employed in the falsification of wines: Mauve, cochineal, and *Phytolacca decandra*. Under the influence of oxygen mauve becomes more and more soluble in water, the reverse being the case with the coloring matter of wine. Cochineal is best detected by the spectroscope. The color of *Phytolacca decandra* is discharged by nascent hydrogen almost instantaneously, whilst pure wine resists for a considerable time; but if a little tincture of *Phytolacca* is added to red wine, it communicates its own instability to the color of the wine, and the color is discharged ten times more rapidly than if the *Phytolacca* had not been added. Ch. News, June 19th, 1874; from Compt. Rend., April, 1874.

*Detection of Adulterated Wines.*—Prof. J. Nessler points out that genuine wines contain chiefly malic acid. Free tartaric acid is rarely found except in spurious concoctions. As a test the author uses a solution of 5 grams acetate of potassium, 5 grams alcohol, and 25 grams water. If an appreciable amount of tartaric acid is present this test produces a

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crystalline deposit of tartar in a quarter of an hour, which is not the case with genuine wines, even if they contain a trace of tartaric acid. No precipitate appears until some hours have elapsed. Genuine wines contain no citric acid. For its detection in small quantities, the wine is rendered alkaline and filtered, and saturated with acetic acid, mixed with chloride of barium, filtered, and a few drops of ammonia added to the filtrate until it has an alkaline reaction. If, on the addition of baryta-water, a white precipitate appears, citric acid is present. Oxalic acid gives a precipitate if lime-water is added in such small quantities that the liquid has still an alkaline reaction (?). Phosphoric acid in genuine wines is found only to the extent of 0.03 to 0.05 per cent. Ch. News, June 25th, 1875, p. 275. Centr. Bl. für Agricultur Chemie.

*Lees.*—According to Warington, the lees which are deposited at the bottom of wine-casks vary in the amount of tartaric acid which they contain as tartrate of potassium and tartrate of calcium, the latter being very large in proportion to the former in those countries, such as Spain and France, where it is the custom to add plaster to the grape-juice before fermentation, while in Italian lees, where plaster is not used, the tartaric acid exists chiefly as the acid potassium tartrate. The beneficial effect of the addition of native plaster, which contains carbonate of calcium, in reducing the acidity is due to the fact that tartrate of calcium is precipitated, and a solution of neutral sulphate of potassium is produced in which the bitartrate of potassium is very slightly soluble.

*Argol* is the impure bitartrate of potassium deposited on the sides of the cask, whilst

*Tartars*, some of which contain as high as 76 per cent. of tartaric acid, are manufactured from the argol by extraction with hot water and crystallization. Ch. News, June 1875, p. 276.

## ERYTHROXYLACEÆ.

*Erythroxylon coca.*—E. B. Shuttleworth has devised formulas for infusion, alcoholic and aqueous extract, fluid extract, and tincture of coca leaves, which will be found under their proper names.

headings in the section "Pharmacy," in this report. In his paper on the subject, the author reviews the history of the plant and its components, especially the alkaloids Cocaina and Hygrina. See Pharm. Jour. Trans., Dec. 19th, 1874, p. 483.

#### PAPAVERACEÆ.

*Poppy Capsules.*—Wittstein has shown that the dried fruit of *Papaver somniferum* does not contain even traces of morphia, and consequently no opium. From the experiments of G. Krause, however, it becomes evident that he had experimented with the ripe and not the unripe dried capsules. Krause has found the dried unripe capsules, of about the size of a walnut, as officinal in the German Pharmacopœia, to contain 0.0021 per cent. of morphia, 0.0009 per cent. of narcotina, and a corresponding amount of meconic acid; all of which corresponds to about 0.021 per cent. of opium. The author operated by the method for the preparation of morphia, as laid down in "Wittstein's Darstellung Chemischer Präparate," which is mentioned in the United States Dispensatory (13th ed., p. 1291) as "Mohr's method." This consists in boiling the infusion with lime. The clear solution contains the morphia, which is precipitated by boiling with chloride of ammonium, and the lime residue contains the narcotina and the meconic acid. The author concludes that poppy capsules should be collected before they have burst, and before the seeds are ripe. Arch. Ph., December, 1874, p. 507.

*Cultivation of Opium in India.*—A recent report on the progress and condition of the Eastern (British) Empire, contains much valuable information on the products of India, from which a short extract is made in Ph. Jour. Trans. (February 20th, 1875). Government exercises a strict supervision over the poppy cultivation, no one being allowed to grow the plant except on government account. The manufacture is conducted at two separate agencies, Patna for Bahar, and Ghazepoor for the Northwest Provinces and Oudh. For the Bahar agency 330,925 acres are under poppy cultivation, and 229,430 for Benares. The poppy requires a high state of cultivation,

the land has to be specially attended to and carefully manured; nevertheless, of late years the plants have suffered from blight. To overcome this, successful trials have been made of the effect of interchanges of seeds between the sister agencies of Bahar and Benares. 42,675 chests of Bengal opium were sold during the year 1872-73.

*India Opium.*—A very interesting paper by Mr. B. Saunders, on the cultivation of opium in India, is republished in the Ph. Jour. Trans., February 14th, 1874, from the official catalogue of the Indian department at the Vienna Exhibition. The author details the method of collecting the floral petals, the leaves of the plant, the seeds, and the juice; the first two mentioned being used in the preparation of the cakes, having been properly prepared and selected for the purpose. The method of preparing the opium is too detailed to find place in this report; suffice it to say that the opium juice, as received from the cultivator, is allowed to accumulate in vats, and is not worked into cakes until it has a density of 70 "so-called," i. e., 70 p. opium and 30 p. water, or is within 50 per cent. of that figure. It is then made into cakes by the use of definite quantities of a solution of opium (obtained by softening down the opium adhering to the vessels in which it is brought to the opium factory), which is called *Lewah*, and is of a strength corresponding to 53 per cent. of dry opium; of flower leaves; of water, and of the leaves of the plant, called trash; the proportions of all of these being such as to form cakes of exactly two seers in weight.

*Opium Culture in Austria.*—Godeffroy communicates the results of some experiments, made in 1871-72, upon the culture of opium on the domain of Prince Schwarzenberg, the point selected being Lobositz, Bohemia. These experiments were conducted under the superintendence of Dr. Hanaman, with minute and careful attention to the mean temperature of the atmosphere and soil, the relative moisture, the evaporation, the dew, the days of rain and snow, etc., during the two years, all of which are exhibited in a tabular statement.

Two varieties of poppy were selected for the purpose; one, the so-called "white poppy," obtained from the Society for



Acclimatization of Berlin; the other the light-brown poppy of Asia Minor, obtained from Mr. Jobst, of Stuttgart. The experiments seem to prove that the latter variety is best adapted to European cultivation; that it will flourish in all soils that are adapted for winter grain, and that the opium may be collected without injury to the yield of seed, for which the poppy is so generally cultivated in some parts of Europe. A sample of opium obtained, contained 8 per cent. of morphia, another 8.6 per cent. (corresponding to 10.31 per cent. dried). *Zeitschr. Oert. Apoth. Ves.*, May 20th and June 1st, 1875, pp. 241 and 260.

*North Carolina Opium.*—Experiments made in North Carolina evidence that the poppy plant thrives well, but that the yield of opium is small, and that this opium, which appears to consist of pure exuded and inspissate juice only, contains but 5.01 per cent. of opium. The writer of the "Report of the United States Department of Agriculture" consoles himself, and his readers, with the fact that India opium sometimes contains no more. The morphia was determined by Procter's method as the best. See *Am. Dr. Circ.*, March, 1875, p. 60.

*Chinese Opium.*—T. H. Bateman, writing from Shanghai, China, contributes some useful and interesting points upon the consumption of and the trade in opium in China, and closes with the following interesting statement in regard to Chinese opium:

"The amount of opium cultivated in China is small to that imported, but the native drug cannot be smoked without previous admixture with the foreign, as it causes some affections of the skin, the nature of which is unknown to me. Frequent edicts are issued from the throne against its culture on pain of forfeiture of land, and imprisonment. This difficulty is overcome by a little judicious 'palm greasing' to the local mandarins. I have by me at present a specimen of the native drug from the Szechuan Province. Its external appearance presents none of the characteristics of Malwa or Patna opium, it being hard, somewhat brittle, and without 'odor.' In fact, it closely resembles a specimen of opium from Gipps



Land, which I had the opportunity of examining whilst at 338 Oxford Street. The average yield of morphia in native opium is 1.5 per cent., although some authorities (!) state the yield to be 6 or even 8 per cent.; a sample containing such a percentage as the latter has, never, unfortunately, fallen into my hands." Ph. J. Trans., May 15th, 1875, p. 906.

*Opium Examinations.*—Professor Flückiger communicates the particulars referring to the examination of a number of samples of opium, alluded to by him and the late Mr. Hanbury in "Pharmacographia" (p. 58). The analyses were made in Professor Flückiger's laboratory, by Dr. Buri, with the following samples:

I. *Patna garden opium*, 1838, wrapped in wax. Under the microscope it is seen to consist, for a large part, of nice crystals, and to be devoid of starch. The crystals may partly consist of alkaloids, partly of sugar.

II. *Medical Indian opium*, 1852, 1853, portion of a square brick. It contains large crystals; no starch.

III. *Abkari provision opium*, Patna, No. 5380 (see "Pharmacographia," p. 49). Small crystals; no starch.

IV. *Garden Behar opium*; exquisitely crystalline; no starch.

V. *Malwa opium*, portion of a flat cake. Not distinctly crystalline; contains starch, which, not being a constituent of poppy juice, is fraudulently admixed.

VI. *Sind opium*, No. 28; large crystals.

VII. *Hyderabad opium*, Sind.

VIII. *Opium from Candeish*, not distinctly crystalline, containing some starch.

IX. *Persian opium*, presented by Mr. Howard (1872); highly crystalline; no starch.

X. *Egyptian Government opium*, from Thebes, as exhibited in 1867, Paris Exposition. Not distinctly crystalline.

XI. *Opium*, produced in 1823 at Playford, Suffolk; containing large crystals.

XII. *English opium*, 1859, from Mr. Morson. Small crystals.

The process for estimating the narcotina and the morphia was that described in "Pharmacographia," p. 59. The ex-

tract *a*, of the following table, is that afforded by means of boiling ether, with which the powdered opium had almost absolutely been exhausted by repeating the treatment with ether some twenty or thirty times. The extract remaining after the evaporation of the ether was boiled with acetic acid, 1.04 sp. gr. This fluid, after the acid had been driven off, yielded *b*, *crude narcotina*, as a brownish crystalline mass. It was washed with ether, and then afforded *d*, *purified narcotina*. Under *c*, the difference between *a* and *b*, representing the amount of *waxy matter*, is calculated. It includes also the oily matter, with which Persian opium, No. IX, is impregnated, as well as a little wax in the case of sample I.

In exhausting the opium with ether a slightly yellowish fluid is obtained which displays a *bluish florescence*, due to an unknown constituent of the drug.

Before precipitating the morphia, the aqueous solution was concentrated in order to get a smaller volume. It afforded *e*, the *crude, dried morphia*, which, after twice or three times repeated crystallization, finally furnished *f*, *purified morphia*. This purification of morphia cannot be performed without a loss of morphia; the real practical percentage of that alkaloid may, therefore, more correctly be regarded as somewhat superior to the figures *f*. It would be desirable to apply a process furnishing the exact percentage, but there seems to be no such method that is thoroughly satisfactory. The results of the analyses are the following:

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.
<i>a</i> . Dried ethereal extract..	24.2	21.7	22.0	20.6	14.1	17.4	20.4	.....	25.0	23.7	18.1	23.6
<i>b</i> . Crude narcotina.....	10.0	9.0	8.5	7.6	7.6	8.0	9.7	.....	10.2	12.2	9.3	11.6
<i>c</i> . Waxy matter.....	14.2	12.7	13.5	13.0	6.5	9.4	10.7	.....	14.8	11.5	8.8	12.0
<i>d</i> . Purified narcotina.....	4.0	6.1	5.5	4.5	4.7	3.1	5.4	7.7	6.4	8.7	6.0	8.1
<i>e</i> . Crude morphia.....	11.2	11.2	14.1	10.6	14.4	.....	.....	.....	.....	.....	.....	.....
<i>f</i> . Purified morphia.....	8.6	4.8	3.5	4.6	6.1	3.8	3.2	6.07	7.1	5.8	4.3	8.3

Professor Flückiger is struck with the very large discrepancy, in the Indian opium, of the figures under *e* and *f*, which he thinks is larger than in opium from Asia Minor. Another

fact well worth considering is the usually low percentage of morphia in India opium, narcotina being frequently present in larger amount. More careful preparation of the Indian opium would seem to be of importance to its possible adoption for making morphia. Ph. Jour. Trans., April 24th, 1875, p. 845.

*Testing Opium.*—C. Arnoldi recommends the following method: 500 grams of dry opium are digested in 8 ounces of distilled water for twenty-four hours; the liquid is passed through a weighed filter, and the insoluble part again similarly digested. The insoluble part is then collected on the filter, washed with water so long as the washings are colored, dried, and weighed. Good opium should not leave more than 200 grams of insoluble residue. The solution is concentrated to 5 ounces, filtered, shaken with bone-char, and again filtered. To the liquid a slight excess of ammonia is now added, whereby a precipitate of impure morphia is obtained; and this precipitate, after warming to expel excess of ammonia, is collected and weighed. Good opium yields 14.19 per cent. of impure morphia. Chem. and Drug., November 14th, 1874, p. 407.

• *Sanguinaria Canadensis.*—Among other constituents of blood-root, Lewis C. Hopp also obtained the *puccina* of Wayne, according to the latter's process, and found it to be nothing more than sanguinarina, with some resin and coloring matter adhering to it, to which the purplish color of the ammonia precipitate is due. These were separated by dissolving the supposed puccina in ether, and passing hydrochloric acid gas into the solution, when pure hydrochlorate of sanguinarina was precipitated. The purification is less readily effected by dissolving the puccina in HCl, adding ammonia, washing and drying the precipitate, and agitating it with ether. The author furthermore obtained *sanguinarinic acid* by Newbold's process (A. J. Ph., 1866, p. 496), and found this to be a mixture of citric and malic acids, as was also a sample of Newbold's acid among the specimens of the Philadelphia College of Pharmacy. The latter was also found to contain as impurity some sanguinarina. A. J. Ph., May, 1875, p. 193.

## CRUCIFERÆ.

*Sarepta Mustard*.—According to H. Haurowitz the unrivalled quality of this mustard is chiefly due to its careful preparation. The seeds are ground with a runner (drug-mill fashion), and the flour, packed in canvass bags, is exposed for a certain time to steam, after which the oil is expressed. The care with which this part of the process is conducted is, in the opinion of the manufacturer, the real secret of its superior quality. In order to deprive the seeds as much as possible of the oil, only small quantities at a time (say 6 to 8 pounds) are expressed. The meal-cakes form bricks of  $4\frac{1}{2}$  by  $2\frac{1}{2}$  by 1 inches, and are ground fine, when large quantities have been collected. The different numbers refer to different degrees of fineness. The yield is stated to be: 1 bushel generally gives 60 pounds of seed; 9 pounds of seed give 1 pound of oil. A. J. Ph., June, 1875, p. 260, from Danish sources.

## CISTACEÆ.

*Cistus salvifolius*, L.—The root composes the drug known in Morocco as “Inferscul.” It is hard and woody, three-quarters to an inch or more in diameter, with a thick spongy cracked bark of a peculiar greenish or olive-brown color. The medullium is of a dirty white color, hard and woody. The plant appears to have grown in a reddish soil, as the surface of the root-bark is of a reddish hue. The taste is earthy, gritty, and very slightly aromatic. It is taken for palpitation of heart, caused by sudden fright, etc. Leared and Holmes, in Ph. Jour. Trans., Jan. 2d, 1875, p. 522.

*Helianthemum Corymbosum*, Mich.—The plant has been subjected to chemical examination by Frederick J. Kruell, who found it to contain tannin, bitter extractive, glucose, chlorophyll, resin, and coloring matter. To the two first mentioned the activity of the plant seems to be due. The herb yielded to diluted alcohol, 28 per cent.; to alcohol, 16.4 per cent.; and to ether, 4.6 per cent. The portion exhausted with alcohol yielded to water 19.6 per cent.; that exhausted with ether

yielded to water 22 per cent. of its weight. A. J. Ph., Aug., 1874, p. 357.

#### PARONCHIACEÆ.

*Herniaria glabra*.—Gobley has obtained from this plant, which abounds in (France?) sandy localities, a peculiar crystalline substance, which he has called *herniarin*. It resembles cumarin, but differs from this in its melting-point. See *Herniarin*, in this report. Zeitschr. Oest. Apoth. Ver., No. 35, 1874, p. 661.

#### PAPAYACEÆ.

*Carica Papaya*.—The milky juice, which exudes from the stem or fruit of this plant when punctured, is used in India to render meats tender and digestible. G. C. Roy has made some experiments, by which he finds that a comparatively small proportion of the juice will convert finely chopped beef, on boiling five minutes, to a semi-liquid mass. When exposed to its influence, at the ordinary temperature, the meat became gelatinous in twenty-four hours. Coagulated albumen, exposed to a dilute solution in water, became pasty in twenty-four hours, and was dissolved in two days. The juice, dried in the sun, forms a hard, yellowish-white, fusible mass, which may be again dissolved in water, and retains its activity. It possesses an acid reaction, but retains its activity in alkaline solution. It is entirely devoid of acrid or corrosive action, and the author finds it difficult to explain the cause of its action, which is more powerful than the digestive process, and is not one of putrefactive fermentation.

The *Papaya* is indigenous to the tropics, grows rapidly, and attains a height of fifteen feet. The stem is branchless, but bears numerous large, hand-shaped, pedicellate leaves. The gourd-like fruit is in its green state used as a vegetable, and when ripe as a dessert, its pulp being quite sweet. It contains numerous seeds, which resemble black pepper. The fruit (unripe?) contains the juice in abundance, about an ounce flowing from a cut in the course of an hour. Zeitschr. Oest. Apoth. Ver., No. 33, 1874, p. 613.

## MYRTACEÆ.

*Eucalyptus*.—At a meeting of the Royal Society of Melbourne, a paper was read by Mr. Bosisto, in which he discussed the question whether the eucalyptus is really a fever-destroying tree. After examining all the evidence, the author arrived at the conclusion that it is really a fever-destroying tree. The rapidity of its growth, its early maturity to a forest tree, together with the power to absorb considerable moisture, and to permeate the air with its peculiar odor, lead to this assumption. Four-fifths of Australian vegetation consist of eucalypts, one hundred and thirty species of which are enumerated by Von Mueller. It is calculated that one hundred thousand million gallons of oil are held at one and the same time in the various eucalypts distributed over New South Wales and South Australia. Considering, also, that the same condition exists throughout the greater part of Australia with the other eucalypts, the author could not arrive at any other conclusion than that the whole atmosphere of Australia was more or less affected by the perpetual exhalation of these bodies, which gave to the atmosphere a healthy and invigorating tone. Ph. Jour. Trans., October 3d, 1874.

*Eucalyptus Globulus*, Labillardière.—J. Homeyer has subjected the leaves to microscopic and microchemical examination, and has analyzed the volatile oils, which he finds to be composed mainly of a terpin and cymol, and of a second terpin of lower boiling-point, and an oxygenated body related to cymol. The last two constitute about one-tenth of the oil. The eucalyptol of Cloëz was found to be composed of a terpin and cymol. The author has ventilated the subject very thoroughly, but his paper is too comprehensive to be completely extracted for this report. Arch. Pharm., November, 1874, pp. 385–405.

*The Barks of various Species of Eucalyptus*, in the collection of the "General Austrian Apothecaries' Association," have been subjected to critical and chemical examination by J. Möller, who sums up his results as follows:

1. The barks of the eucalypts are, histologically, more variable than is common with the species of other genera.

2. All of these barks contain tannic acid and coloring matter.

3. Some species form resin in the bast parenchyma.

4. In some few species it is proved that the cellular tissue is converted into a gummy substance; in others, in which this fact cannot be proven, the possibility of such metamorphosis is not excluded, since such metamorphosis is depending upon causes that do not reside in the plant.

5. The various commercial sorts of eucalyptus-kino (the name is adopted as proposed by Wiesner) are probably aqueous extracts, as they contain the constituents of the bark which are soluble in water.

6. It is probable that the barks of various species of eucalyptus are used for the preparation of one and the same extracts, and the difference of Wiesner's results, as compared with the extracts prepared by the author from the barks, may be explained on that supposition. *Zeitschr. Oest. Apoth. Ver.*, May 10th and 20th, 1875.

*Pomegranate Root-bark.*—At the meeting of the British Pharmaceutical Conference (1874), Dr. De Vrij calls attention to the different opinions existing as to the efficacy of pomegranate root-bark. Formerly the bark, collected in the south of France or in Italy, enjoyed a good reputation. Some were of opinion that the real root-bark had gradually been substituted by the stem-bark; others were of opinion that fresh root-bark should be used; others supposed that only the root-bark grown in India was efficacious, or that only the extract made in India from the fresh root-bark was efficacious. His own opinion was that all *real* root-bark, wherever collected, is efficacious. He obtained 40 per cent. of aqueous extract by cold percolation from root-bark of his own collection in Java eleven years ago, and had recently removed a tapeworm after the administration of fifty-six one-grain pills of this extract, seven pills being administered each quarter of an hour.

Mr. W. W. Stoddart, commenting on the author's paper,



remarked that in Bristol frequent calls were made for the pomegranate bark by foreigners for the treatment of dysentery. Proc. Brit. Ph. Conf., 1874, p. 504.

*Bertholetia Nobilis*, Miers.—The variety of *Bertholetia*, which yields the Brazil-nut, is so named by Miers in distinction from *B. excelsa*. Enormous quantities of the nuts are exported annually from Pará, and from Manáos, on the Rio Negro. The hard fruits which fall to the ground are broken in the forest by the Indians, where a man and boy will break about three hundred of them a day. Dr. Berg had asserted that the seeds are enveloped in a yellow fleshy pulp, which, by desiccation, leaves each inclosed in a distinct sort of a cell; but Miers states that the fruits, examined by him, afford no traces of pulp; and there is direct evidence on this point in a specimen belonging to the Linnæan Society, where a cluster of fine seeds, evidently the contents of one cell, are agglomerated very closely together upon a portion of the columella, without the slightest trace of any pulp or any funicle. Moreover, Bonpland, Poiteau, and Schomberg, who examined them in the living state, and gave abundant details concerning them, are all silent as to the existence of pulpy matter. The kernels yield about nine ounces of fixed oil from a pound, which is used for domestic purposes and for export, and which, according to Martius, is composed of 74 per cent. of olein and 26 per cent. of stearin. The finely laminated inner bark of the tree, which reaches a height of one hundred and thirty feet, with a trunk of fourteen feet diameter up to a height of fifty feet, finds application for various purposes, and is especially adapted for calking ships, barges, etc. The leaves of the tree are ten to fifteen inches long, and the fruit is globular, and six to six and a half inches in diameter. The pericarp of the fruit is so thick (three-quarters of an inch), that it is a matter of surprise that the seeds should germinate at all before fermentation and decay results, probably four years being required before the pericarp and thick testa of the seeds can rot sufficiently to allow the embryo to germinate. Ph. Jour. Trans., March 13th, 1875, p. 726.



## SALICARIÆ.

*Henna* (*Lawsonia spinosa* and *L. inermis*).—According to M. G. Delchevalerie these two varieties are cultivated in Egypt, where, according to the variety, they are valued for their flowers, as a dye plant, in making garden hedges, etc. *L. spinosa* differs from *L. inermis* by its very spiny and much finer leaves. A fragrant distilled water is prepared from its blossoms. The leaves of *L. inermis* yield the article known in commerce as henna powder, and furnishes the dye plant, being for this purpose sown or planted very thickly, and the branches are mown as soon as they have reached the height of a metre. Henna has been in use among the Egyptians from the most ancient times, the leaves having been employed as a medicine and as a cosmetic. The ancient writers mention its astringent and tinctorial properties, and the ancient Egyptians made use of henna for the purpose of perfuming the oils and unguents with which they anointed their bodies. Dioscorides mentions it under the name of cypress, as does also Pliny. Avicenna compares the properties of henna with those of dragon's blood. The coloring principle, which is known as hennotannin, is very abundant in the leaves, and might probably be advantageously used in manufactures. The culture is easy, and might probably be carried on successfully in Italy and in Central France. Ph. Jour. Trans., July 4th, 1874, p. 8.

## ROSACEÆ.

*Wild Cherry Bark*.—John L. Williams endeavored to isolate the bitter principle of wild cherry bark, in which he did, however, not succeed satisfactorily. He concentrated the aqueous infusion, filtered, mixed it with an equal volume of alcohol, allowed it to stand twelve hours, and filtered again. The filtrate was treated with milk of lime, the mixture filtered, evaporated to a syrupy consistence, diluted with a large quantity of alcohol, filtered, and evaporated. The residue was exhausted by boiling alcohol, which on spontaneous evaporation yielded a brownish, transparent residue of a somewhat gelatinous aspect. The substance so obtained was

bitter, insoluble in ether, sparingly soluble in water, more soluble in alcohol, particularly if heated. A. J. Ph., Feb., 1875, p. 53.

*Hagenia abyssinica*, Lamarck—F. A. Flückiger and E. Buri state that the name *koso*, applied to the female flowers of the tree, is more appropriate than *koussou*; the first-named term, according to W. Munzinger, corresponding in sound to the appellation given it by the native Abyssinians. The authors are of opinion that the tree may be profitably cultivated in some parts of Europe. They have made some comprehensive experiments on the chemical properties and relations of kosin (*koussin*), using for this purpose a very handsome crystalline, and evidently pure article, made by E. Merck. Prof. Buchheim has examined the pure kosin therapeutically, and finds that the anthelmintic properties of pure kosin are incomparably less than the *koussin* of Bedall, which seems to be associated with a second (resinous?) principle, to which its medicinal virtues are due. (See Kosin, in this report.) Arch. Ph., Sept., 1874, pp. 193–205.

*Potentilla*.—Prof. J. M. Maisch, in a paper on the constituents and properties of the genus *Potentilla*, reviews a number of species, indigenous to this country and Europe, and describes their botanical characters, habitat, etc. The medicinal properties of this genus seem to reside principally in tannic acid; some few species containing, besides, resin and volatile oil. Some of the species have acquired quite a local reputation as remedial agents. A. J. Ph., March, 1875, p. 109.

#### LEGUMINOSÆ.

*Spurious Senna*.—A new variety of senna has made its appearance in the London markets, which may be distinguished from the officinal drug by the peculiar arrangement of the veins of the leaf. Instead of having one central vein, with all the others branching from it, as in senna, the leaves of this variety have two or more prominent veins starting from the centre of the base of the leaf, and these are repeatedly forked in an almost parallel manner. The leaves appear to belong to

a species of *Cassia*, and may therefore possess purgative properties. Pharm. Jour. Trans., Jan. 9th, 1875, p. 552.

Mr. E. M. Holmes has had opportunity to examine a further supply of this spurious senna, which contained some flowers and twigs, and has identified it to belong to *Cassia brevipes*, D. C., subgenus *Chamaecrista*, a native of Costa Rica and Panama. The author gives the following description of the

FIG. 45.



drug: The twigs above mentioned have hairy stems, and the leaves are alternate, compound, with a very short petiole, bi-jugate, and the rachis ends in an extremely fine short hair-like point. The leaflets, which are so closely placed as to overlap each other, are entire, unequal at the base, about one inch and a quarter long, somewhat elliptic in outline, the lower margin being less curved than the upper; they are mucronate at the apex. The most marked feature, however, consists in the venation. Three principal veins start from the base of the leaflet, and diverging but slightly, proceed nearly to the apex. Each of these three veins is branched in a pinnate manner at a very acute angle (about  $7^{\circ}$ ), so that at a casual glance the leaf appears furcate-veined. The two lower leaflets on each leaf are smaller than the two upper ones. The pods are brownish, about twice as long as broad, and covered with yellowish erect hairs. The stipules are lanceolate, with a cordate base, and have numerous veins. The

flowers are large and yellow, with rigid scarious sepals, and are solitary in the axils of the leaves.

An entire leaf, with a flower-bud in the axil of the leaf, a leaflet showing the peculiar venation, a stipule, and a pod (natural size) are shown in Fig. 45.

The author has tried the medicinal effect of infusions of this spurious drug on his own person, and finds that in doses corresponding to one-quarter and one-half ounce of the leaves, it is entirely without effect. Ph. Jour. Trans., February 6th, 1875, p. 623.

*Liquorice*.—This was once largely grown at Mitcham, but, although it is still grown in considerable quantities, it is not near so extensively cultivated, on account of the cost attending its culture. It entirely occupies the ground for three years, and during that time requires great attention in the way of cleaning, besides the ultimate cost of trenching out the roots, or rather underground stems. The ground being deep, is heavily manured in autumn or winter, when it is trenched and laid up in ridges, in a rough state, until spring. It is then levelled, marked off in drills about two or three feet apart, and some three or four inches deep, and in these the sets are planted in March. The sets consist of finger-length pieces of the old root-stems, each containing an eye or two. During the first year the ground is usually intercropped, as is also the case in the earlier portion of the second year, but after the middle of the second summer, and throughout the whole of the third year, the liquorice requires all of the room. When the stems are matured in the autumn of each year, they are cut over close to the ground, and if time can be spared the soil between the rows is forked over, some well-decayed manure being occasionally worked into it at the same time. The lifting of the crop, which usually takes place in the end of the third season, is a difficult operation, requiring much labor. A deep trench is cut out, lengthways, alongside the first row, and by means of forks, pulling-ropes being even sometimes used, the root-stems are extracted. In this manner all of the rows are treated. The roots may be stored in sand or pits. Ph. Jour. Trans., Sept. 1874, p. 182; from the Garden.

*Araroba*.—Dr. J. F. Da Silva Lima, referring to an article by Dr. Fayrer, of Calcutta, on the treatment of ringworm by “Goa powder,” gives important evidence that this secret remedy—which has been used with such undoubted success in various cutaneous affections—has for its active ingredient the powdered pith of the araroba, or, as some call it, the arariba tree, belonging to the *Leguminosæ*, and perhaps related to the tree of the same family furnishing the “Brazil-wood” of commerce. The powdered pith is known in the province of Bahia as “Araroba powder;” but in the other Brazilian provinces it is known as “po’ de Bahia.” Dr. Fayrer speaks of a remedy known in India as “Poh di Bahia,” as equally efficacious as the Goa powder, but traces the origin of the name to Malay sources. Dr. Lima has evidence that the araroba powder possesses all the therapeutic effects of the Goa powder; that large quantities are exported to Portugal; that the powder is not known under that name in Portugal; and that, therefore, it is highly probable that the powder is re-exported from Portugal to its colonies on the coasts of Asia and Africa. The statements of Dr. Fayrer, on the authority of Mr. Kemp, that large quantities of urzella (*Lichen orcellis*) are exported from Mozambique to India, and his inference that it is used as the principal constituent of Goa powder, seems to give further evidence of the correctness of Dr. Lima’s views. Whether correct or not, however, it is certain that araroba powder is quite as effective, if not superior to Goa powder, or the Poh di Bahia of Indian commerce. The best form of applying the remedy is, as Dr. Lima recommends, in the form of ointment: twenty to forty grains of the powder with ten drops of acetic acid to an ounce of lard. In its pure state (as powder) it is too irritating. Ph. Jour. Trans., March 13th, 1875, p. 723.

Professor Attfield has made a chemical examination of araroba powder, which had been sent to him by Mr. David Kemp, of Bombay, the latter proposing for it the name of

*Chrysarobin*, literally “yellow araroba,” as more appropriate than its synonyms, “Bahia powder,” “Goa powder,” “Brazil powder,” “Ringworm powder,” etc. The sample

sent was a yellow powder containing some fragments of vegetable fibre. Its composition is remarkable, since it contains from 80 to 84 per cent. of chrysophanic acid. Besides this, it contains a glucoside, a bitter principle or principles, and a variety of arabin (?), amounting together to 7 per cent.; 2 per cent. of resin-like bodies;  $5\frac{1}{2}$  per cent. of vegetable fibre;  $\frac{1}{2}$  per cent. of mineral matter (ash), and 1 per cent. of moisture. The ash is composed mainly of silicate of aluminium and the sulphates of potassium and sodium. It yields very little to cold water; hot water dissolves about 7 per cent. of its constituents, and the hot decoction possesses a bitter taste, and is of a yellow color; perfectly neutral to test-paper, scarcely affected by alcohol, and is free from starch and tannin. It contains the glucoside and the bitter principle, which require further examination, and the arabin-like matter. The chrysophanic acid was readily extracted from the portion which had been treated with hot water and dried, by means of benzole, and purified by recrystallization; first from benzole and then twice from alcohol. The portion undissolved by benzole consisted of the resin-like bodies and woody fibre. The former was extracted by hot alcohol, and consisted of a yellow body soluble in ether, and a red body insoluble in ether. The chrysophanic acid was also obtained by sublimation. Owing to the large quantity contained in the chrysarobin, this may obviously be used as a dye. Pharmaceutically, it may be used in the form of pills with soap, confection, or in powder. Its composition precludes the preparation of either aqueous or alcoholic extract; but it is, obviously, a rich source for chrysophanic acid. Ibid., p. 721.

E. M. Holmes has examined a quantity of the drug, as it lately appeared in the Liverpool market, with a view to determine its exact botanical source. It consisted partly of lumps of a yellowish substance, some of which was in a state of powder, and partly of fragments of a yellowish wood. The lumps were not all yellow, some had a pink color when broken, and some were almost entirely made up of grains or layers of a dark-red or brown substance. On slicing some of the fragments of wood, the powder was found to occupy in-

terstices in the wood, in which it must have been deposited during the growth of the tree. As some lumps are of a considerable size, it appears probable that portions of the woody fibres decay in the heart of the tree, leaving araroba deposited in the cavities thus formed. The term araroba, it seems, is applied in Bahia to a number of trees. The fragments of wood appeared to be very similar to that of *Cæsalpinia echinata*; while leaves from some plants, the cuttings of which had been deposited in the Royal Botanical Gardens at Edinburgh, by Mr. J. L. Patterson, appear also to be that of a variety of *Cæsalpinia*, nearly allied to *C. sappan*. Martius, in his "Materia Medica of Brazil," mentions *Cæsalpinia* as one of the plants to which the term araroba is applied; but in his "Flora Brasiliensis," he also mentions that araroba is the vernacular name for two species of *Centrolobium* (*C. robustum* and *C. tomentosum*). The description given in this work of the wood seems to correspond with the characters of the araroba above mentioned.

The author has made some experiments to determine the identity of araroba with Goa powder. The principal physical difference is in their color; but as the Goa powder is not always of the same color, the different samples, as described at various times, varying from light-yellow through various shades of red and brown to chocolate-brown, this does not seem to be very important; for in the sample of araroba powder, above described, the author met with nearly all of these colors. By his experiments he obtained the various reactions of chrysophanic acid, mentioned by Professor Attfield as the most prominent constituent, and the author therefore concludes that, taking the evidence of Dr. Lima and others, together with the results of Attfield and his own observations, Goa powder will, by accurate chemical examination, be found identical with araroba powder, or "chrysarobin," as it has been proposed to call it. Ph. Jour. Trans., April 10th, 1875, p. 801.

#### COMPOSITÆ.

*Santonica*.—Dr. Linstow draws attention to a fatal dose of santonica flowers, 10.0 grams having been administered to a

girl 10 years old, with fatal effect in two days. Hager mentions an instance in which a boy 4 or 5 years old had taken a teaspoonful with very dangerous but not fatal results. He cautions therefore against its administration in excessive doses, and recommends the following table of doses:

Children from	Single dose.
2 to 3 years, . . . . .	1.5 grams.
4 to 5 " . . . . .	3.0 "
6 to 8 " . . . . .	4.0 "
9 to 11 " . . . . .	5.0 "
12 to 14 " . . . . .	6.0 "

Ph. Centralhalle, No. 39, 1874, p. 321.

#### DIPTERACEÆ.

*Gurjun Balsam.*—Mr. William Gilmour, in a paper read before the Pharmaceutical Society of Great Britain (North British Branch), communicates some observations on its therapeutic effects both in India and in Great Britain. Attention had been first directed to it some twenty years ago as a new kind of balsam of copaiba, but Mr. Hanbury, some years later, traced it to its true sources, *Dipterocarpus lœvis*, and other trees of allied genera, indigenous in the hot, damp Indian forests, and also mentioned some of its peculiarities and distinguishing characteristics. It has been used with remarkable effect in India in the treatment of leprosy. Dr. Dougall uses a mixture of equal parts of lime-water and gurjun balsam, given internally, and freely used as a liniment. Most encouraging results have been obtained in England in the treatment of painful eczema, lupus, and cancer. Ph. J. Trans., March 13th, 1875, p. 729.

#### TEREBINTHACEÆ.

*Manilla Elemi.*—Prof. Flückiger has contributed to the British Pharmaceutical Conference a very valuable paper upon "The Chemistry of Elemi," in which he reviews the results obtained by previous experiments, especially of Baup, and gives the results of his own. Baup had found among the components of *Manilla elemi* two crystallizable principles,



*bryoidin* and *breïdin*, both of them soluble in water. Prof. Flückiger's experiments seem to establish the identity of these two principles, since he has failed to obtain the latter, but did obtain a crystalline modification of *bryoidin*, which corresponded to *breïdin*. Baup had obtained the two substances in the aqueous residue in the still, after subjecting the elemi to distillation with water. Flückiger became convinced that a dilute alcohol would be more suitable, and has modified the process for preparing *bryoidin* as follows: The resin is subjected to gentle distillation with alcohol of sp. gr. .972 (containing 22 per cent.); the oil distilling over being separated from the alcoholic distillate from time to time, and the latter returned to the still until oil no longer comes over. The weak alcoholic residue in the still contains nearly all the *bryoidin*, and it does not, therefore, pay to treat the resinous residue any further. The alcoholic liquid is subjected to distillation to remove the alcohol, during which a very small proportion of *amyrin* (resinous crystalline constituent of elemi) is deposited, together with a little amorphous resin. These are removed, and the aqueous filtrate is then gently evaporated, and allowed to repose from time to time for twenty-four hours, and the *bryoidin*, which separates, collected. If the liquid is concentrated too much, or heated to full ebullition, a portion of the *bryoidin* is volatilized along with the water; but by gradual evaporation it is obtained in approximate purity. By too rapid concentration, and neglect to remove the principle from time to time, it also becomes contaminated with a brown *bitter substance*, which, subsequently, impedes purification. The *bryoidin* is purified by repeated crystallizations from 22 per cent. alcohol, but the final yield is much reduced thereby. Instead of the voluminous mosslike crystals, obtained in the earlier stages of the operation, *bryoidin* may at last be obtained in the form of brilliant prisms by spontaneous evaporation, and this the author considers to be the *breïdin* of Baup.

*Bryoidin* melts at 135°-136° C. (=275°-276.8° F.); sublimes readily at a more elevated temperature, but volatilizes below 100° C. (=212° F.); the crystals are anhydrous, are

readily dissolved by alcohol, bisulphide of carbon, chloroform, ether, and acetic acid ; also in essential oil of elemi or glycerin. The author has failed to ascertain its solubility in cold or boiling water, but in either of them it seems to be sparingly soluble. Its ultimate composition corresponds to  $C_{20}H_{38}O_3$  ( $O=16$ ), resembling in this *Terpin*  $C_{10}H_{16} + 3H_2O$  ( $O=16$ ). The *bitter substance* seems to be present in small quantity, though larger than bryoidin. The author has failed to isolate it. Proc. Br. Ph. Conf., 1874, pp. 496-503.

*Japan Wax*.—Some further particulars, respecting the preparation of vegetable wax, are communicated to the *Japan Mail*. The tree producing the wax-berry is not unlike the juniper tree, and flourishes in the southern provinces of the empire. The fruit ripens in October, when it is gathered, cleansed from its loose, outer husk by a process which is accomplished in wooden vessels, with wooden malls similar to those in use for cleaning rice. The bean-shaped kernels, so obtained, are about the size of a lentil, possess an unusual degree of hardness, and are of a dark, yellow waxy color. It is exposed to a steaming process to render the wax more fluid under the press, and the expressed oil is received into small earthen vessels, in which it hardens, and assumes the shape and bluish-green color of the article for home consumption. For export it requires purification, which is conducted by boiling with lye, exposing to the sun's rays for fifteen to sixteen days, for the purpose of bleaching it, and repeating this process, substituting water for the lye when boiling, until the wax is white. By this treatment the wax assumes a powdery condition, and then only requires melting and running off into flat vessels, so as to form it into cakes. It differs exceedingly little from ordinary beeswax, the most characteristic difference being its odor, which is tallowy, and far from agreeable. Ph. Jour. Trans., Nov. 28th, 1874, p. 425.

#### ANACARDIACEÆ.

*Rhus Venenata*.—The poison sumach has been partially analyzed by Mr. Robert M. Cotton, who obtained from the decoction of the powdered leaves a crystalline acid possessing

the following properties: It formed congregated clusters of minute, transparent, triangular prisms, was non-volatile, and decomposed at a high temperature, possessed a moderately sour taste, and reddened blue litmus quite distinctly in aqueous solution, produced white precipitates with chloride of barium, with neutral acetate of lead, and with hydrate of lime, but not with nitrate of silver, phosphate of magnesium, chloride of mercury, and a large number of other reagents. The acid may be obtained readily by boiling the powdered leaves with water for some time, straining, expressing, and filtering the decoction while hot, then boiling with and filtering through animal charcoal, precipitating with neutral acetate of lead, decomposing the precipitate with sulphuretted hydrogen gas, filtering, evaporating, and crystallizing. Recrystallization effectually purifies the acid, the greater part of the coloring matter having been removed by the animal charcoal. A. J. Ph., Aug. 1874, p. 355.

#### RHAMNACEÆ.

*Rhamnus Frangula*.—The bark, which is officinal in several of the European Pharmacopœias, is strongly recommended by Mr. H. C. Baildon, who believes it to be far superior to most of the vegetable cathartics now in use. He is supported in his opinion by Mr. R. H. Giles, and by an experience of twenty years with the bark on his own person and some of his relatives. The kind of bark that should be used is the quilled bark of the young trunks and of the larger branches, such as is described by the German Pharmacopœia. The bark taken from the thick part of the trunk is altogether different, the decoction made from it having a nauseous taste, whereas the decoction made from the quilled bark is singularly pleasant, with flavor of bitter almond or prussic acid. The author expresses the hope that his communication will have the effect of calling the notice of physicians and pharmacists to the value of the medicine, which possesses properties peculiar to itself, and which are not found in senna and other drastic purgatives. Ph. Jour. Trans., May 9th, 1874, p. 889.

*Rhamnus Cathartica and Rhamnus Frangula*.—The juice of

buckthorn-berries is, according to Van Pelt, frequently adulterated, and it is said that the juice of the berries of *Rhamnus frangula* is, in Belgium, frequently substituted and sold for that of buckthorn berries. Insomuch as it is a disputed point, whether the berries of *R. frangula* possess purgative properties at all or not, the author draws attention to some distinguishing points between the berries of the two varieties of *Rhamnus*. The berries of *R. frangula* resemble those of *R. cathartica* to some extent, but differ in their color and form of their seeds. The juice of buckthorn berries communicates to water a handsome purple color, whereas that of the berries of *R. cathartica* communicates a wine-red color. But the chief distinguishing marks are afforded by reagents, as will be seen by the following:

Reagent.	<i>Rhamnus cathartica</i> .	<i>Rhamnus frangula</i> .
Chloride of iron,	Dark-green color,	Reddish-brown color.
Sol. subacetate of lead,	Yellowish-green precip.,	Blue-green precipitate.
Alum,	Green color,	Purple color.
Sulphate of iron,	Brown color,	Violet color.
Tartar emetic,	Green color,	Purple color.
Bicarbonate of sodium,	Handsome dark-green color,	Greenish-blue color.
Lime-water,	Yellowish-green color,	Blue-green color.
Sulphate of magnesium,	Reddish-brown color,	Rose-red color.
Alum, followed by boiling carb. of potassium,	Yellowish-green precip.,	Greenish-blue precipitate.
Sulphate of copper, followed by ammonia,	Green color,	Blue color.

These reactions serve to distinguish the juice from the two sources very markedly. Ph. Centralhalle, No. 33, 1874, p. 268.

*Buckthorn Juice*.—The ripe buckthorn berries yield, according to C. Umney, from 45 to 50 per cent. of juice, which, when freshly prepared, has the following characters: Sp. gr. 1.070 to 1.080, of a green color, which gradually changes to red on account of the acidification of the mucilaginous and saccharine matters, of which considerable quantities are present, accompanied by a copious deposition of an inulin-(?) like matter. After the lapse of a year the specific gravity will have decreased, on account of this change, to about

1.035. Four commercial samples examined by the author were found to have the specific gravities of 1.005, 1.004, 1.007, 1.007 respectively, indicating that water is the chief ingredient of the Succus Rhamni of trade. Ph. J. Trans., July 11th, 1874, p. 21.

#### PIPERACEÆ.

*Peppers.*—H. Wynter Blyth has subjected a number of peppers of commerce to chemical examination, with the following results:

	Soluble ash.	Total Ash.		Hygroscopic moisture.	Alcoholic extract from dry pepper.	Aqueous extract from dry pepper.	Ammonia yielded to water.	Nitrogen yielded to water.
		Pepper in the dry state.	Pepper in its ordinary condition.					
	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
Penang, . . .	2.2120	4.189	3.8480	9.581	7.650	18.385	0.450	0.370
Tellicherry, .	3.3800	5.770	5.8460	12.908	7.836	16.500	0.450	0.370
Sumatra, . .	2.6260	4.316	3.8340	10.108	6.450	17.500	0.875	0.310
Malabar, . .	3.4530	5.195	4.6740	10.548	6.875	20.375	0.295	0.243
Traug, . . .	2.5380	4.775	4.2110	11.664	6.300	18.175	0.325	0.300
A white pepper,	0.5580	1.120	0.7889	. . .	7.650	. . . .	. . . .	. . . .
Long pepper, .	4.4720	8.308	7.1548	10.778	2.600	16.825	0.175	0.144

The author has not determined the piperin direct, but, calculating the nitrogen of the first five samples as piperin, the average amount taken up by boiling water and retained by cold water = 0.017 per cent. Chem. News, October 9th, 1874, p. 170.

*Matico.*—This name, which in commerce is properly applied to *Artanthe elongatum*, seems, according to "The Gardeners' Chronicle," to be applied by the inhabitants of Quito to an entirely different plant, *Eupatorium glutinosum*. The latter is a shrub, three to five feet high, which is common in the higher parts of the Quitinian Andes, where its properties were discovered some years back by a soldier called Mateo, better known under the nickname Matico (little Matthew), who,

being wounded in action, applied the leaves of this shrub with good effect in stopping the bleeding. In honor of the discoverer of this property, the shrub has since been called Matico, in place of its familiar name "Chessalonga."

Another plant, *Waltheria glomerata*, possessing similar properties to the above, has also obtained the name of Matico in the Panama region, where it is also known as Pado del Soldado, or Soldiers' Tree, and a story very similar to that given above is connected with it. According to Dr. Seemann the same story, with more or less variations, is told of many other vulneraries of Spanish America. It appears from this, therefore, that the name Matico, in South America, is generic rather than specific. Ph. Jour. Trans., January 2d, 1875, p. 523.

#### EUPHORBIACEÆ.

*Euphorbia Terracina*, L.—A Morocco drug, named "Was-kiza," has been identified by Leared and Holmes to be the root of this plant. It occurs in slender pieces, of a pale-brown color externally, barely a quarter of an inch in diameter, and about three or four inches long. The root is sparingly branched. Internally it is pale, with a large, faintly radiate medullium. Its taste is earthy and slightly acrid, and its medicinal use is as an emetic. Ph. Jour. Trans., January 2d, 1875, p. 522.

*Castor Beans*.—The method of gathering and preparing castor beans for market in California is as follows: Every day the ripe spikes are gathered by hand, put in sacks, and hauled to the "popping ground," which is a space of about an acre, made smooth and hard, like an old-fashioned buckwheat threshing ground. Here the spikes are spread, and during the day they pop open, from the heat of the sun, throwing out the beans. Each morning the straw is raked off, the beans shovelled up, cleaned in a fanning mill, and sacked, ready for market. By the time the field is once picked over, it is ready for another picking, the season commencing in August. The yield is estimated at one thousand five hundred pounds per acre. A. J. Ph., February, 1875, p. 85.

*Castor Oil*.—From an extract taken from the Official Catalogue of the Indian Department of the Universal Exhibition, it would appear that the preparation of castor oil in India is still by the primitive method of boiling the bruised seed in water. The plant is cultivated extensively all over India, and is sown in June by almost all the villagers, not extensively, but principally for their own use. In Cuttack the oil is extracted in two ways (?), both methods being, however, wasteful. The oil obtained from the large seeds, *Ricinus communis major*, is used for lamp oil; whilst that from the small seeds, *R. communis minor*, is used medicinally. *Ph. Jour. Trans.*, February 21st, 1874.

*Kamala*.—C. Schneider has made experiments to determine the amount of earthy impurities in a number of commercial samples of kamala, the experiments being induced by having met with a sample of the drug which contained the enormous amount of 41 per cent. of ash. The following are his results:

Kamala.	Ash.	Of which soluble in Muriatic Acid.	Sand.
No. 1, . .	4.966 per cent.	1.551 per cent.	3.415 per cent.
" 2, . .	21.608 "	3.249 "	18.354 "
" 3, . .	21.747 "	3.357 "	18.390 "
" 4, . .	24.540 "	3.756 "	20.748 "
" 5, . .	26.086 "	6.704 "	19.377 "
" 6, . .	26.238 "	4.007 "	18.739 "
" 7, . .	27.005 "	6.882 "	20.628 "

Of the above samples, No. 1 is the only one that corresponds approximately to the requirements of the German Pharmacopœia, and this the author has reason to believe is a prepared article, from which the sand has been removed by levigation. It is the author's impression that the presence of sand is owing to carelessness when collecting the drug, rather than an intentional adulteration. Experiments, made with a view to remove the sand by levigation, convince the author that this is exceedingly difficult. *Arch. Pharm.*, January, 1875, p. 58.

*Aleutritis Tribola*.—Dr. Calixto Oxamendi has made some researches on the therapeutic action of the fixed oil obtainable in large percentage from the nuts of the *Aleutritis tri-*



loba—the candleberry tree—and finds it to afford an excellent substitute for castor oil, which it greatly resembles in its action on the bowels, while it is by no means as disagreeable, having a taste resembling that of hazelnuts. The author thinks that its laxative effects are not only due to the disturbance produced in the bowels by the oil itself, but also to a special resin which irritates the intestinal mucous membrane. He also proposes its application in form of a liniment, with tincture of cantharides and carbonate of ammonium, as useful in cases of rebellious constipation or abdominal pains. *Ph. Jour. Trans.*, June 26th, 1875, p. 1032; from *Med. Record and Anales de Medicina de la Habana*.

#### URTICACEÆ.

*Hop Culture in Wisconsin.*—W. H. Ramsey contributes some interesting information on the culture and curing of hops in Wisconsin. The plant is propagated by cuttings from the rhizome, which have to be removed from the main root each year; the grubbing, as it is termed, being performed after the frost is out of the ground in spring. A rich, black sandy loam, with a subsoil that will hold water well, such as is found in the vicinity of Reedsburg, Sauk County, Wisconsin, is best adapted for their culture. The rhizomes, removed by grubbing, are cut into pieces six or eight inches long, each piece containing two or three pairs of eyes, and are planted as early as spring weather will permit, usually in April, four or five pieces in a hill; the latter being in straight rows, usually eight feet apart each way. The hop plant does not yield until the second year, when the vine is trained on poles fifteen to sixteen feet in length; two or three poles to each hill, and two or three vines to each pole. The plant flowers about the middle of July, remains in blossom a week or ten days, then expands and forms the strobiles of commerce, which are allowed to remain on the vine until about the first of September to ripen. The picking is performed mostly by women and children, who gather the fruit into boxes, the size of which is regulated by law.

The average weight of a box of hops when dried is about



ten pounds, the average number of boxes picked by each person being two. The drying is performed in kilns, in houses of stone, brick, or wood; the first two materials being preferred, while the latter is usually used. The kilns are commonly 16 x 20 feet, and 14 to 15 feet from the ground to the kiln floor, and 8 feet from this to the roof. The kiln floor is made of slate, 1 inch by 2-2½ inches, set upon the edge, about 2 inches apart, upon which is spread burlap weighing eleven ounces to the yard. At the bottom of the kiln, on each side, are one or two holes, about 3 feet long by 1 foot high, called air-holes, and closed by a slide. The hops are placed upon the kiln floor a foot to a foot and a half deep, and the drying is done by means of an ordinary stove, the pipe of which runs beneath the kiln floor, about a foot from the burlap, forming a square. During the early part of the drying gentle heat is used, and the temperature of the room is not allowed to rise above 100° to 120° F. The air-holes below are kept open during this time, as is also a ventilator situated in the centre of the gable-roof. Simultaneously with the drying a little brimstone is burned in a small dish, on the stove, to bleach the hops; the quantity used varying with the condition of the latter. The process requires about twelve hours, and the heat is, towards the last, increased to 140°-150° F. Care is requisite that the temperature does not recede at any time, as the steam would settle back and injure the appearance of the hop. The drying process ended, the fires are put out, and the room is ventilated as much as possible, so as to induce rapid cooling. The hops are transferred from the kiln into a room, called the cooling-room, in which they are kept until wanted for baling, and are turned from time to time to prevent heating in case of insufficient drying. The crop does not seem to yield as abundantly as it did formerly, the yield in 1874 not exceeding 600 to 800 pounds per acre; whereas, in 1866 and 1868, the yield reached the incredible amount of 2400 to 2500 pounds per acre. The author's paper gives much other information, and details of the above, which make its perusal profitable. . A. J. Ph., June, 1875, pp. 241-245.

The age of the hop can be told pretty accurately until it is three years old, when it becomes doubtful. During the first year it retains its bright color and fine, aromatic smell, and the lupulin is bright yellow. The second year they become darker, have a less fine (a slightly cheesy) odor, and the lupulin is of a golden-yellow color. The third year the color is about the same as the second, but the odor becomes faint, with the same cheesy smell. The lupulin is of a dark-yellow or reddish tint. Ibid.

*Lupulin.*—In order to free it from sand, which often contaminates it, Sarrazin proposes to wash it with water. The lupulin was several times suspended in ten parts of water, and poured off rapidly. It was then collected on a filter, and dried upon it, at between 25°–30° C. (= 77°–86° F.). From 50 grams the author obtained 34 grams of purified lupulin, and the washings only contained between 2 and 3 grams of extract. The medicinal effect of the lupulin was not affected by the washing. The author also prepared a liquid extract (see Fluid Extracts, in this report). Arch. Ph., Oct. 1874, p. 523.

*Shellac.*—One of the most difficult problems in the manufacture of shellac varnish is its rapid clarification without too much loss. A. Peltz's experiments seem, however, to have overcome this. He finds that when one part of shellac is dissolved in six parts of alcohol of 90 per cent., and the solution is then mixed with one-half as much chalk as shellac has been used, and heated to 60° C. (= 140° F.), the solution becomes perfectly clear to about half its volume, and upon longer standing about three-quarters will become clear, while the turbid portion will filter easily and rapidly. By washing the filter with a little alcohol all of the shellac is recovered, and a perfectly clear solution obtained.

While satisfied with these results the author experimented in another direction, with results, if anything, more satisfactory. Instead of using chalk, as the clarifying agent, he endeavored to remove the wax, to which the turbidity of shellac solutions is due, by an appropriate solvent. He

selected for this purpose petroleum ether, and found that it will remove the wax effectually, if one part is agitated with three parts of solution of shellac, prepared as above indicated. The mixture separates in a few moments, forming two perfectly transparent layers, of which the upper layer contains the wax, and is decanted, while the lower layer only contains traces of petroleum ether. An objectionable feature in this process, however, consists in the brittleness of the shellac after the alcohol is evaporated. This may be overcome by adding 1 to 3 per cent. of Venice turpentine. Common benzine will answer as well as the more expensive petroleum ether. The alcohol should not be stronger than 90 per cent., but rather a little weaker. Ph. Centralh., No. 17, 1875, p. 139; Ph. Zeitschr. Rus.

#### MONIMIACEÆ.

*Boldo* (*Peumus boldus*, Molina).—This interesting Chilean plant has, during the past two years, attracted the attention of medical practitioners on account of its reputed remedial qualities, and has been recently the subject of an elaborate thesis by M. Claude Verne. The “Boldo” is an alpine shrub met with frequently in the Chilean Andes. Formerly it was met with only in the mountains, but grows now upon the cultivated districts. It always grows isolated, never in forests, and has not been met with outside Chili. The shrub or tree attains a height of five or six metres, and is an evergreen, having cylindrical branches bearing cylindrical opposite branchlets. The thin bark is adherent to the wood, corrugated longitudinally, of a clear brown color, and very aromatic. The green leaves change in drying to a reddish-brown, are coriaceous, with prominent midrib, veins alternate, sometimes opposite, covered on their surface with small glands. They are opposite, entire, and oval, and have a fresh aromatic taste, and an odor recalling that of the Lauraceæ and Labiatae. The flowers are dioecious, in racemes placed at the end of the branchlets, of a pale yellowish-white color. The yellowish-green fruit has an aromatic, succulent, sweetish mesocarp,

which is eaten, and the very hard kernels are made into necklaces by the Chilians.

The leaves are the portion of the plant used in medicine for the sake of the aromatic oil they contain (see Volatile Oils in this report); besides this they contain a trace of alkaloid, citric acid, and a considerable quantity of aromatic substances. The author has devised and recommended various pharmaceutical preparations (extracts, tincture, syrup, wine, elixir, etc.), which will be found under their respective headings in the section "Pharmacy" of this report. These preparations are said to have been administered with success in the Hôtel Dieu and Hôtel Beaujon in cases of atony of various organs when the patients have been unable to tolerate quinia. Care, however, is required in their administration, as vomiting is provoked by large doses. Ph. Jour. Trans., Nov. 21st, 1874, p. 405.

#### CONIFERÆ.

*Damarra Australis*—New Zealand Kauri Gum.—M. M. Pattison Muir has had opportunity to examine some Kauri gum sent to him by his brother, Mr. John M. Muir. The resin, which is largely imported into Great Britain for making varnish, occurs in the form of a hard, brittle, yellowish white mass, which is readily cut with a knife. Its surface becomes highly polished by rubbing, which, at the same time, excites electricity. Here and there throughout the mass non-transparent milky blotches occurred. Its fracture was conchoidal. Sp. gr. = 1.042. It is partly dissolved by water, but the greater part is insoluble, the insoluble portion being partially soluble in alcohol. About 52 per cent. of the original substance is soluble in boiling alcohol, while the residue was almost entirely dissolved by digestion in ether at the ordinary temperature. Its alcoholic solution possesses an acid reaction; traces of benzoic and succinic acid were also discovered. Upon the basis of these results the author classifies Kauri gum among the "gum-resins."

The author also describes the action of concentrated mineral acids, of bromine, of iodine, and of caustic alkalies upon the

gum-resin. By destructive (dry) distillation dense fumes are given off, and a heavy brown oil, possessing a greenish fluorescence, together with considerable water, are condensed, while a thick dark-red liquid remains in the retort, which solidifies on cooling to a brittle, transparent solid. The oil was determined, by fractional distillation, to be a mixture of oils of various boiling-points. A. J. Ph., Oct. 1874, p. 472; from Jour. Chem. Soc., 1874.

## UNCLASSIFIED.

*African Copal*.—Captain Elton gives an interesting account of the source and collection of the semi-fossil copal on the East African Coast region, known as the Mrima Coast. The copal tree (*Trachylobium* sp.), called *Msandarusi*, indicates the region of the fossil gum. It yields an abundance of gum, called *chakazi*, or raw and tree copal, which, however, is little valued in European markets, but is exported to Bombay and China. In the old days the trees would appear to have lined the shores, but the existing *Msandarusi* are now found away towards the foot of the low hills bordering the Mrima, and on all the terraced lands sloping down from the ridges to the present sea-beach. The true or ripe copal, *Msandarusi*, is the produce of vast extinct forests, and is buried at depths beyond atmospheric influence. Below four feet no gum is found worth taking, and very few diggers go below three feet in search of it. The chief centre of supply is the Kuale district, where there are eleven stations for carrying on the copal trade. Captain Elton mentions that, in spite of many difficulties, the trade prospers, and that, the supply appearing inexhaustible, its collection would afford the means of supporting a far larger community than that which is now sparsely scattered along the coast, if the region was under settled rule, and the working more systematic. Ph. Jour. Trans., Dec. 19th, 1874, p. 490; from Gardener's Chronicle.

*Damiana*.—A rather obscure remedial agent has, during the past year, been frequently drawn attention to in certain journals in a manner which led to the inference that the name

was fictitious, and was applied only to a certain nostrum. Dr. J. J. Caldwell, of Baltimore, however, has communicated a paper on the subject to the Medical and Surgical Society of Baltimore, in March, 1875, from which it appears that a plant is found on the Western borders of Mexico, not very far from the sea, which is there known by the name of "Damiana," that it is there habitually used in the form of tea, that it possesses powerful tonic and aphrodisiac properties, and that when long used it exerts decided action upon the genital organs. The leaf is the part of the plant used, but the root is said to possess similar medicinal virtue. There seem to be two species of the same plant, one with white blossoms and small leaves, which is the best; the other with yellow blossoms and large leaves. Until an accurate botanical description of the plant, its habits, the exact location of its occurrence, etc., are given, all statements with regard to it should be received with caution. Dr. Caldwell's paper is published in the Virginia Medical Monthly, May, 1875, p. 108.

### *b. Animal Drugs.*

#### ANNULOSÆ.

*Leeches.*—J. C. Rothenhäusler, who deals largely in leeches, recommends that they be kept in a cool place in the cellar, in wooden vessels containing a layer of pebbles, the size of a filbert, about eight to ten centimetres high; such vessel being provided with a faucet by which the water may be drawn off. In summer the water should be changed every two or three days, in winter every five to six days. The mucus should be removed from the pebbles every two weeks, hence it is advisable to have two such vessels, so that they may be changed from one to the other. The second vessel also serves a good purpose for the reception of fresh leeches. The author never removes the leeches by the hand, but uses for this purpose a small wire cullender. Ph. Centralhalle, No. 52, 1874, p. 430.

Mr. Clay W. Holmes succeeds well in keeping leeches, rarely losing more than five in a hundred, and sometimes not one in

five hundred, by observing the following simple precautions: On receiving a package, which consists usually of one hundred leeches, contained in a wooden bucket filled nearly full of their native muck, he immediately examines the leeches, putting them into water to see if they are healthy and active. He then examines the muck, to see that it is good, and throws out anything that would be detrimental. They are then returned to the bucket with the muck, a few small holes being bored into the cover. Once a week the leeches are taken out, placed in water of about 60° F. for fifteen minutes, and are then put back, the muck being dampened with a little water. The bucket is kept in a cool place in summer; in the dispensing-room, under the counter, in winter. In handling the leeches the touch should be as soft as possible. The Pharmacist, November, 1874, p. 327.

*Leeches in Anjou.*—An interesting paper on the occurrence, habits, and collection of leeches in the marshes of Anjou is contributed by C. Ménière to the Rep. de Pharm. Anjou possesses nearly all the species of leeches as well as numerous varieties. There exists a considerable difference in certain species, according to the marsh in which they are found. For instance, the experienced fisher can distinguish the official leech which has lived in the marsh in the midst of vegetation, for in other conditions it no longer presents the same character. It is also believed by some persons that the color of the water influences the color of the leech, and while the author attributes only secondary importance to this point, he considers that the chemical nature of the water affects the abundance or scarcity of the leeches. He describes some leeches as *parasites* and some as *sedentary*. The term “parasite” is applied to those which attach themselves to the bodies of various animals inhabiting the marshes. To this class belong the *Pisciola piscium* and the *Hirudo geometra*, the latter being by no means rare in Anjou. The sedentary leeches are those that never leave their native marshes. To this class belong the *Hirudo vulgaris* and the *Hæmopsis sanguisuga*, commonly called the horse-leech. Occasionally the leeches are collected in nets with very fine meshes, but as a



rule the fishermen wade into the marshes and allow the leeches to fasten on to their bare legs. Ph. Jour. Trans., June 19th, 1875, p. 1009.

#### INSECTA.

*Honey.*—The honey of European commerce is frequently adulterated, chiefly with starch-sugar or molasses, but occasionally also with flour, potato-meal, dextrin, tragacanth, etc. Hager recommends the following method for testing for the first-named: 5 grams of the honey are dissolved in 45 c.c. of alcohol of 70 per cent. (sp. gr. 890), with which it should produce a nearly clear solution. Upon standing, a yellowish-white or yellowish-gray insignificant deposit is formed, which is collected upon a filter and divided into three or four portions. One of these is tested microscopically for starch-granules, and for pollen-granules. The presence of the former and the absence of the latter are presumptive evidence that the article examined is entirely a syrup of starch-sugar. The addition of iodine-water to another portion confirms the test, as does also the addition of alcohol of 90 per cent. to a portion of the solution, by which dextrin is precipitated. The author observes, however, that occasionally a starch-sugar syrup is met in commerce which is perfectly pure; free from starch, dextrin, and sulphate of calcium. Molasses, containing chloride of sodium: this is detected by acidifying the solution with nitric acid and adding nitrate of silver. In pure honey but faint turbidity is produced generally. Schweitz. Wochenschr., January 15th, 1875, p. 11.

According to a writer in the Boston "Cultivator," most of the so-called strained honey, sold in bottles, is a compound of cane-sugar and a decoction of slippery-elm bark, or of gum arabic and starch, flavored with a little Cuban honey. A. J. Ph., July, 1874, p. 346.

*Beeswax.*—An article termed "refined beeswax" has, by Dr. A. W. Miller, been observed in the market, which upon examination proved to be adulterated with paraffin. The adulterant was detected by heating 100 grains of the suspected article with 1 ounce sulphuric acid, at a temperature of 350°



F. for fifteen or twenty minutes, by which the beeswax is charred, and then diluting the mixture with several ounces of water. After cooling, a sheet of paraffin weighing 80 grains was obtained. The experiment was verified by a mixture of 1 part of wax and 4 parts of paraffin, the same results being obtained. The author proposes this method in preference to the use of Nordhausen acid, recommended in text-books. The adulterant may also be detected by the difference in the melting-point, by the translucent character imparted to the beeswax, and by the mode of contraction; wax adulterated with paraffin exhibiting a concave surface, while the pure wax exhibits a flat surface, the contraction on cooling forming vertical fissures. A. J. Ph., November, 1874, p. 510.

#### PISCES.

*Isinglass.*—Joh. Kattus states that the white Russia (Astrachan) isinglass is rendered white and thin-leaved by mechanical and chemical means, and that it loses more or less of its strength, both as an adhesive and a clarifying medium, by such treatment. Those that are best informed upon the subject—the brewers of England and Belgium, etc.—invariably prefer the thick-leaved and more or less colored article, not alone on account of its lower price, but chiefly on account of its better quality. The author intends his remarks to refer to the product of the Astrachan fisheries, which is treated most rationally, and is the best. All other kinds contain more or less of insoluble impurities, such as membrane, fibre, etc. A large experience supports the author in his statements. Ph. Centralhalle, No. 18, 1875, p. 149.

*Os Sepiæ.*—T. S. Wiegand has contributed to the Am. Jour. Pharm. (Jan. 1875, pp. 7–10) an interesting paper on this product of *Sepia officinalis*, and incidentally gives several methods of preparing some tooth powders in which it is employed, which will be found elsewhere in this report.

#### MAMMALIA.

*Milk.*—The observation made by Schwalbe that the addition of one drop of volatile oil of mustard to twenty grams

of cow's milk prevents the milk from souring, has induced Vogel to repeat the author's experiments, which he finds to be correct. The milk, however, becomes unfit for dietetic purposes, and the author therefore made experiments with other volatile oils, added in like proportion, which would not interfere with its consumption as food. For these experiments he selected the volatile oils of bitter almonds and of cinnamon, but neither of these, or the volatile oils of cloves and turpentine, nor carbolic acid, benzene, and bisulphide of carbon, had the power to prevent the formation of lactic acid.

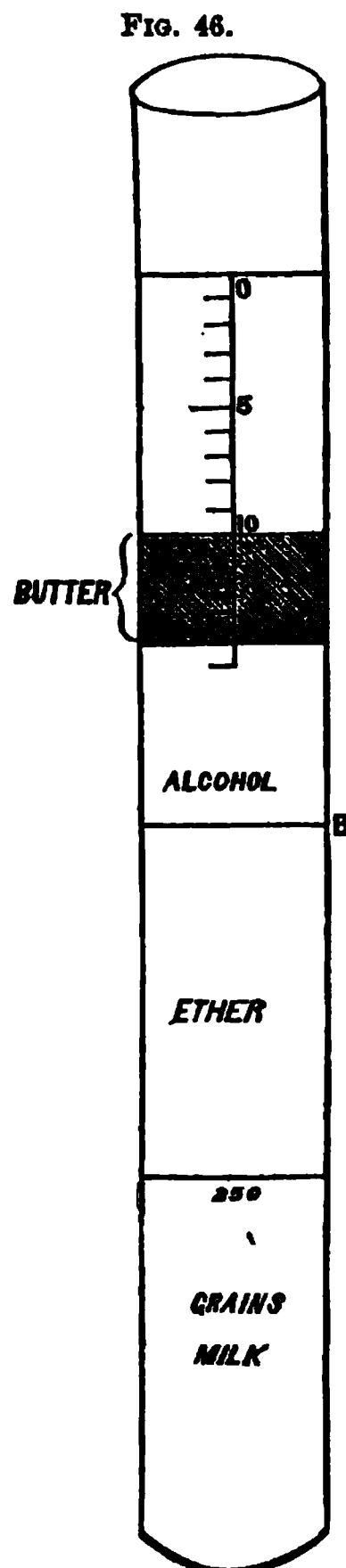
The observation of Schwalbe, that by the action of the oil of mustard the casein of the milk is converted into albumen, is regarded by Vogel as of great importance, if correct. Vogel's experiments, in this direction, leaves the correctness of the statement an open question. N. Rep. Ph., Nos. 8 and 9, p. 505.

It having been asserted that unless milk be analyzed before it is six hours old the results are not reliable, Mr. E. L. Cleaver made some experiments with an average sample of milk, in order to determine the changes that would take place at the ordinary temperature. A quantity of milk, purchased early in the morning, was divided into several small portions, and placed into bottles, which were tightly corked. One portion was analyzed immediately after purchase, and the rest from time to time. The results, taken at a temperature of 70° F., were as follows:

No.	Date of Analysis.	Total Solids.	Fat.	Ash.
1, . . .	April 30th, 1874.	12.48	8.6	.7
2, . . .	May 1st, "	12.87	8.6	.7
3, . . .	" 2d, "	12.18	8.6	.7
4, . . .	" 4th, "	12.12	8.6	.7
5, . . .	" 6th, "	12.09	8.6	.7
6, . . .	" 8th, "	12.07	8.6	.7
7, . . .	" 12th, "	11.97	8.52	.7
8, . . .	" 18th, "	11.97	8.4	.7

It will be seen from these experiments, extending over a period of three weeks, that decomposition does not, in an average sample, proceed at a very rapid rate; and that in an analysis, made even after two or three days, the error would be inappreciable. Ph. Jour. Trans., June 6th, 1874, p. 973.

*A New Lactometer.*—W. W. Stoddart, in a paper read before the British Pharmaceutical Conference, draws attention to a convenient little apparatus for estimating, volumetrically, the fat contained in milk, the invention of Mr. Horsley of Cheltenham. By it the weight per cent. of cream, and an estimate of the casein, the sugar, and salts, may be ascertained with great ease and rapidity. The method of analysis is this: The milk to be tested is poured into the tube (Fig. 46) till the first mark is reached, measuring 250 grains. Ether is then added until the next mark (B) is reached, and the whole well shaken together for five minutes. Alcohol is next poured in up to 10 of the graduations (c), and again shaken. On placing the tube in the stand, the fat will rise to the top as a bright oil, the measure of which will indicate the weight, because each graduation is equal to 4.15 grains of fat. The casein separates, and falls to the bottom of the tube as a white mass, capable of being strained off, dried, and weighed. The remaining fluid, after evaporation to dryness, will give the amount of sugar and salts. The tube can also be used as an ordinary lactometer, for every degree is  $\frac{1}{100}$ th of the whole. Some other applications, in connection with butter analysis, are likewise pointed out by the author, for which see the original paper, and the discussions on same, in Proc. Br. Ph. Conf., 1874, pp. 541–544 and 580–586.



*Composition of various Milks.*—C. A. Cameron has made numerous analyses of cow's, mare's, and sow's milk, the following being his average results:

	Cow's Milk.	Mare's Milk.	Sow's Milk.
Water, . . . .	87.00	90.810	81.760
Fats, . . . .	4.00	1.055	5.830
Albumenoids, . . .	4.10	1.958	6.180
Sugar, . . . .	4 20	6.285	5.885
Mineral Matter, . .	0.62	0.897	0.895
	<hr/> 100.00	<hr/> 100.000	<hr/> 100.000

The author's results with *cow's milk* agree very well with those given by Wanklyn and others. *Mare's milk*, which is bluish-white, was found to be neutral, or faintly alkaline, and to have a sp. gr. of about 1.031. Gorup-Besanez states, on p. 416 of the second edition of his "Lehrbuch der Physiologischen Chemie," that mare's milk contains 17.163 per cent. of solids, including 6.872 per cent. of fats. Clemen and Simon had also found it very rich in solids. The author's experience leads him to doubt that the milk analyzed by these chemists had been that of the mare, which, being akin to the ass, would be likely to yield, like the latter, a milk poor in solids, and poorer still in fats. *Sow's milk* has a sp. gr. of 1.041; its reaction is faintly alkaline; its color yellowish-white. The results of analysis show this milk to be very rich. It is remarkable that in the lactometer it shows up no cream. Drying on the water-bath it exhales the odor of roast pork, and on putrefying that of putrid bacon. Ch. News, February 5th, 1875, p. 54.

*Milk.*—The experiments of A. Hirschberg, made in 1871, upon the conservative effect of boric acid on milk, have been repeated by Prof. Polli, with results similar to those of the former. The former author again refers to his experiments of 1871, and states that he has found the addition of one gram of boric acid to two pounds of milk to cause the latter to keep unchanged for a comparatively long time, and that the quantity of boric acid is not sufficient to render the milk unfit for use or to impair its taste. Borax has been found by Polli to be equal to boric acid as a preservative; but Hirschberg gives decided preference to the latter, as borax is apt to change the color of the milk to yellowish, and imparts to it a soapy taste. Dumas and Carlo Pavesi have likewise studied

the subject, and apparently with similar results. Hoppe and Alex. Müller attribute conservative action upon milk to the acids in general. Arch. Pharm., December, 1874, p. 521.

*Milk.*—O. Hammarsten has determined that the presence of milk-sugar is not necessary to the coagulation of milk by rennet. Milk was precipitated by common salt, the precipitate dissolved in water, the butter was separated by agitation, and the casein again precipitated by common salt. The casein was then again dissolved in water, and the solution, which was now perfectly deprived of milk-sugar, was readily coagulated by rennet. The reaction can therefore not be attributed to the production of lactic acid from milk-sugar by the influence of the rennet, but must be due to a peculiar ferment contained in the latter. The author also details his experiments, embracing the isolations, properties, and reactions of the ferment. (See Ferments, in this report.) Ch. Centralbl., No. 50, 1874, p. 791.

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## INORGANIC CHEMISTRY.

### OXYGEN.

*Ozone.*—C. Gianneti and A. Volta have noted that the starch and iodide of potassium test is not as delicate as might be expected. After ozonized air had been passed through six vessels containing starch and iodide of potassium, and had failed to give any blue color in the last vessels traversed, Schönbein's test-paper gave distinct indications of ozone. For its estimation the authors prefer a modification of the method of Houzeau, which is based upon the above observation, that the action is not complete when the ozone simply bubbles through the test solution. The ozone was collected in flasks containing the test solution, and left in contact with the latter for twenty-four to forty-eight hours. Houzeau's observation, that a slow electric current gives the most ozone, is confirmed, but the authors believe that the most favorable

yield is above that given by Houzeau. J. Chem. Soc., 1875, p. 607; from Gaz. Chim. Italiana, iv, 471.

A. Boillot observes that one of the most striking properties of ozone is its bleaching power. The effect ascribed to chlorine is really due to ozone. Ozone employed directly acts as an oxidizing agent, laying hold of the hydrogen of the substance with which it is in contact, whence results bleaching if the body is colored. On allowing chlorine to act upon any animal or vegetable matter, it decomposes a certain quantity of water, and seizes its hydrogen, forming hydrochloric acid. The oxygen set free by this reaction is transformed into ozone, which in its turn lays hold of hydrogen present in organic matter. Chem. News, June 4th, 1875, p. 250; from Compt. Rend., May 3d, 1875.

#### HYDROGEN.

*Pure Distilled Water* is, according to E. Boivin and De Loiseau, capable of decolorizing Fehling's test solution, 20 c.c. of which added to a litre of distilled water being so changed upon boiling a few minutes. No decolorization is observed under the same circumstances if a small quantity of calcareous salt, *e. g.*, chloride of calcium, be previously added. The purity of distilled water may, therefore, be ascertained by boiling 50 c.c. with 1 c.c. of Fehling's test.

*Potable Water.*—Dr. John N. Niglas draws attention to Kletzenski's method of purifying ordinary water for potable purposes. A solution is prepared of phosphate of aluminum, 1 part; phosphate of oxide of iron, 2 parts; phosphate of magnesium, 2 parts, in a sufficient quantity of phosphoric acid of the Pharmacopœias Austriaca (—16 per cent. anhydrous acid). The phosphates must be freshly prepared, and the solution filtered. When required as a purifying agent, this solution, which will keep any length of time, is added to the water in small quantities as long as cloudiness is produced, the water is then allowed to stand until the precipitate has subsided, and the clear water may then be used for potable purposes. The action of the phosphatic liquor is explained thus: The lime-salts usually contained in water will abstract

the phosphoric acid, holding the phosphates of aluminum, iron, and magnesium in solution, which, being deprived of their solvent, precipitate along with the phosphate of calcium formed, and carry with them, either mechanically or in chemical combination, such impurities as may exist in the water. The magnesium absorbs all the free ammonia, the oxide of iron combines with any sulphuretted hydrogen and other gases of decomposition present, while the alumina and the phosphate of calcium will mechanically drag down suspended impurities. The addition of a slight excess of the precipitant is in no way objectionable. The Pharm., Dec. 1874, p. 353.

Dr. F. Fischer proposes to determine organic matter in potable waters, by means of permanganate and ammonia, by evaporating 500 c.c. almost to dryness with a few drops of hydrochloric acid, and distilling the residue with an alcoholic solution of potassa. The distillate is received in 20 c.c. of a one-tenth normal acid, and the excess of acid determined with a one-tenth normal potash solution. Ch. News, April 10th, 1874; from Moniteur Scientific, 1874.

*Peroxide of Hydrogen.*—Julius Thomsen proposes the following method for its preparation: Peroxide of barium in fine powder is added to dilute hydrochloric acid almost to saturation. To the solution, cooled and filtered, baryta-water is added till the silica and the extraneous oxides have been thrown down, and a faint precipitate of hydrated peroxide of barium is formed. The liquid is then filtered, and baryta-water added in quantity, when crystalline hydrated peroxide of barium is thrown down. The precipitate is washed on a filter until the washings are free from hydrochloric acid, and is preserved in the moist state in closed vessels. To prepare peroxide of hydrogen this moist hydrate is added to dilute sulphuric acid, with constant stirring, and this is continued until only a trace of free acid remains, when the sulphate is allowed to subside, the liquid is filtered and cautiously neutralized with dilute baryta-water. Ch. News, April 2d, 1874; from Ber. d. D. Ch. Ges.

Schoen proposes the following new reagent for peroxide of hydrogen: Calcined titanous acid is dissolved in boiling sul-



phuric acid, and the solution is poured into a large quantity of pure water. Hydrated titanous acid is thrown down, which may be easily redissolved in dilute sulphuric acid. This solution is colored orange or yellow by the peroxide of hydrogen. Ch. News, May 29th, 1874; from Bull. de la Soc. Chim. de Paris.

#### NITROGEN.

*Anhydrous Nitric Acid.*—Berthelot has found R. Weber's method of its preparation satisfactory. With slight modifications he has obtained 60–70 per cent. of the theoretical quantity. The process consists in mixing monohydrated nitric acid with powdery phosphoric acid, and carefully distilling the mixture into a refrigerated receiver. The mixing of the two acids must be done in a freezing mixture. The anhydrous phosphoric acid keeps well in a loosely-stopped vessel under a bell-glass over sulphuric acid. It is readily decomposed, especially under the influence of light. Pharm. Centralhalle, June 4th, 1874, p. 178.

*Nitric Acid.*—Since nitric acid is largely prepared from Chili saltpetre, the presence of iodine is of frequent occurrence in it, and may, according to A. Hilger, be best determined as follows: The acid is diluted with an equal part of water, and agitated with about one-quarter the entire volume of bisulphide of carbon. Any free iodine (which is of seldom occurrence) is dissolved by the bisulphide. If none is taken up, however, a few small pieces of rasped tin are added, and the mixture is shaken. After a few minutes' reaction, which may be hastened by gentle heat, the bisulphide assumes a violet color, if iodic acid is present. The reaction is very delicate, and is dependent on the formation of nitric oxide or nitrous acid, both of which reduce iodic acid very readily. Arch. Ph., May, 1875, p. 391.

*Removal of Nitric Acid Stains.*—The well-known yellow stains of nitric acid can, when recent, be removed from the skin, or from brown or black woollen garments, by moistening the spot for awhile with permanganate of potassium solution, rinsing with water, and removing the brown stain



of manganese with sulphurous acid solution. If the spots are old they cannot be entirely removed. Ch. News, Dec. 18th, 1874, p. 286; Reinman's Faerber Zeit.

#### SULPHUR.

*Sulphur.*—During some analytical processes the suspended sulphur is very difficult to remove by filtration, passing constantly through the filter with the liquid from which it has separated. Hager states that it can readily be removed by adding a few drops of bisulphide of carbon, which dissolves the sulphur upon shaking, and then remains on the filter. Pharm. Centralhalle, June 25th, 1874.

Professor Gesner has had opportunity to inspect the sulphur beds of the "Island of Saba," and believes them to be the largest, and certainly the richest and most accessible, deposits of brimstone in the world. The mass of the beds is gypsum, bearing sulphur to a greater or less degree, 60 per cent. being the average of sulphur. In many places masses of sulphur, quite pure, and resembling melted brimstone, poured into irregular moulds, could be had, a hundred pounds in weight. Mr. G. C. Blackwell sends the following analyses of two samples of Saba sulphur:

No. 1. Sulphur, 80.57; silicate and sulphate of calcium, 14.90; water, 4.53; = 100.

No. 2. Sulphur, 75.81; silicate and sulphate of calcium, 20.56; water, 3.63; = 100.

The volcanic fires died out in Saba so long ago that no trouble is experienced from gases, etc., and the sulphur quarries can be operated as easily as a bank of clay. Ch. News, June 11th, 1875, p. 262.

*American Sulphur.*—One of the most remarkable deposits of native sulphur, as yet discovered, is a great hill composed of the almost pure article, found some two years ago at a distance of thirty miles south of the Union Pacific Railway, and nine hundred miles west of Omaha. This marvellous deposit is found to consist almost wholly of sulphur, containing 15 per cent. of impurities. The best deposits had hereto-

fore been found in Sicily, and these contain but 34 per cent. of sulphur. Our western deposit seems, therefore, to become ere long of great importance. Am. Drug. Circ., Nov. 1874, p. 189.

*Sulphuric Acid.*—The occasion of breakage of several carboys of sulphuric acid in the hold of a vessel, whereby iron rivets, etc., which were out of contact with the acid, had been destroyed, led H. Vohl to investigate the cause. He found that when straw was moistened in a retort with sulphuric acid ( $66^{\circ}$  B.), acid gases were evolved, and these proved to be principally formic, acetic, and meta-acetonic acids. After two days' standing the acid products were again examined, when it was found that the production of organic acid had decreased, while sulphurous acid, which had been formed in very small quantities before, had increased. After four days the mixture eliminated copious quantities of sulphurous acid. Experiments made with willow, fir, and oak sawdust, led to the same results. No artificial heat had been used, the atmospheric temperature being  $9^{\circ}$  R. ( $=52.25^{\circ}$  F). Ph. Centralhalle, No. 36, 1874, p. 292.

*Chamber Crystals.*—The generally assumed view of the constitution of these crystals, that they are a nitro compound of sulphuric acid, nitro-sulphuric acid, is directly proven by A. Michaelis and O. Schumann, who found that by perchloride of phosphorus they are decomposed in a manner accordant with that view, yielding the corresponding chloro-sulphuric acid. Ch. News, Jan. 15th, 1875, p. 31; Ber. Chem. Ges., Sept. 15th, 1874.

*Sulphuric Acid.*—According to F. M. Raoult sulphuric acid may be distilled without the least danger, if a small quantity of retort coal (coke?) is placed into the retort. The coal, which must be broken into small pieces, is not used up very rapidly, losing but a small percentage of its weight, after long-continued use. Coal which has been used for this purpose, is capable of producing a stain like graphite, and it is possible that it may find industrial application. Ch. Centralbl., No. 2, 1875, p. 18.

## SELENIUM.

*Selenium.*—The following method of preparing selenium from the deposit of the leaden chamber of a sulphuric acid works, proved, according to Falun, very successful. The washed material is digested in a quite concentrated solution of cyanide of potassium at  $80^{\circ}$  to  $100^{\circ}$  C. ( $= 176^{\circ}$  to  $212^{\circ}$  F.), until the red color is just changed to a pure gray. The residue is washed with boiling water until hydrochloric acid no longer reddens the wash-water. The solution is filtered, and hydrochloric acid is added, which precipitates the selenium in cherry-red flakes. The selenium is purified from traces of copper and iron by boiling with caustic soda, precipitating with hydrochloric acid, dissolving in nitric acid, evaporating to dryness on a water-bath, and subliming the white silky needles of selenic anhydride. J. Appl. Ch., April, 1875, p. 57.

## CHLORINE.

*Chlorine.*—According to Fr. Stolbe the HCl, which is by the common methods of its preparation so difficult to remove from chlorine, is readily removed, if the gas is generated slowly and is first allowed to pass through a concentrated solution of sulphate of copper, containing some pieces of pumice, before washing it with water. The method depends on the ready formation of chloride of copper and SO<sub>2</sub>, when muriatic acid vapor is passed through solution of sulphate of copper, whilst free chlorine has no effect upon that salt. Arch. Ph., October, 1874, p. 358.

*Hypochlorite of Calcium.*—C. T. Kingzett has observed that needle-shaped crystals were formed in a saturated solution of chlorinated lime which had been exposed during a frosty night. He was likewise enabled to obtain them by evaporating such a solution in vacuo, and on analysis they proved to be hypochlorite of calcium. The author's observation is important in its bearing upon the constitution of bleaching powder, and also from the fact that hypochlorite of calcium has never before been isolated. Ch. News, March 12th, 1875, p. 113; Proceed. Ch. Society, March 4th, 1875.

*Bleaching-powder.*—Mr. J. Patterson read, before the Newcastle-upon-Tyne Chemical Society, an interesting paper “On the Rate at which Bleaching-powder loses its available Chlorine.” Nine samples of bleaching-powder, of various ascertained strengths, were placed in glass bottles holding about half a pound, and kept in these, loosely corked, in a room where they were never exposed to the direct rays of the sun. At first they were tested once a week, afterwards once a fortnight, and ultimately once a month during the last six months; the examination extending over a period of twelve months. The author gives his results in tables, showing the percentage of available chlorine contained in each sample, and consequently the loss sustained at each period of examination. As anticipated, the loss of chlorine was greater during the warm summer months than in the winter months; the greatest loss sustained during any one month being during the month ending August 8th (1873), the average loss being 1.4 per cent. With reference to the question as to the relative stability of weak and strong bleaching-powder, the author’s experiments show that there is practically no difference in the rate at which they lose available chlorine.

The following table is compiled from the author’s tables, and is intended to show the original strength of the samples of bleaching-powder, and the entire loss sustained by them from January 20th to September 8th:

	Original strength.		Percentage of loss.	
A1, . . .	28.7	per cent.	5.2	per cent.
A2, . . .	37.4	“	5.1	“
A3, . . .	37.1	“	4.8	“
B1, . . .	32.9	“	5.4	“
B2, . . .	35.2	“	4.1	“
B3, . . .	36.7	“	5.1	“
C1, . . .	31.8	“	4.0	“
C2, . . .	37.6	“	6.1	“
C3, . . .	37.6	“	3.8	“

The process used for testing was that known as Penot’s process, in which an alkaline solution of arsenious acid, with iodized starch-paper as indicator, is employed. The samples examined were made by what is now known as the old pro-

cess, in which chlorine is generated in the ordinary stone stills by the action of hydrochloric acid on native peroxide of manganese. Chem. News, March 27th, 1874, p. 143.

*Muriatic Acid.*—A. Hilger finds the method proposed by Hager for the determination of arsenic and sulphurous acid in muriatic acid exceedingly satisfactory, but finds the following modification of that method more rapid and convenient. Two to three cubic centimetres of acid are diluted with an equal part of water, and the mixture is treated with an aqueous solution of iodine (1 to 100). If decoloration of the iodine solution results, either sulphurous or arsenious acid, or both, are present, and the addition of iodine is continued until in slight excess. The mixture is then tested for arsenic, by introducing into the test-tube a few pieces of chemically pure zinc, and loosely inserting a cork into which a small strip of parchment-paper saturated with nitrate of silver has been clamped. In the presence of arsenic the strip of paper is blackened by the HAs evolved, and a test must then also be made for sulphurous acid, to which the decoloration would necessarily be attributed in the absence of arsenic. The sulphurous acid is detected in the presence of arsenic by treating a small quantity of the suspected acid, diluted with twice its quantity of water, with chloride of barium in excess, to remove any sulphuric acid present. The filtrate is treated with iodine as in the previous test, when, if sulphurous acid was present, a white precipitate of sulphate of barium is produced by the sulphuric acid formed from the sulphurous acid. Arch. Ph., May, 1875, p. 394.

#### BROMINE.

*Bromine* is now manufactured to such an extent in the United States that, since 1870, considerable quantities are exported to Europe. The source is the bittern of the salt furnaces in the Ohio River and the Kanawha salt regions. This, after concentration in iron pans, is distilled with the addition of sulphuric acid and chlorate of potassium, or binocide of manganese, in sand or fireclay stills of 100 to 300 gallons capacity, and the bromine fumes are condensed in leaden or earthenware coolers. The Kanawha region has eleven facto-

ries, which are capable of producing over 200,000 pounds annually. The Ohio region turned out in 1873 from 170,000 to 175,000 pounds. Am. J. Ph., February, 1875, p. 69; from Circular No. 24, Philadelphia Drug Exchange.

#### IODINE.

*A new source of Iodine and Bromine.*—The experiments of H. Zenger seem to point to fresh-water plants as an abundant source of both iodine and bromine, which, the author believes, are most abundantly distributed in these plants. Experiments made with *Cladophora glomerata*, prove the plant to yield 58.85 per cent. of ash, which was found to contain, in the hundred weight, 21.5 grams of iodine, and 8.5 grams of bromine. The author proposes to continue his experiments upon other aquatic plants. Arch. Pharm., February, 1875, p. 137.

*A new source of Iodine* is probably destined to be utilized through the experiments of Thibault. Various natural phosphates are known to contain appreciable quantities of iodine, in the form of iodide of calcium. The phosphorite, found in the Département de Tarn-et-Garonne, is treated in the powdered state with sulphuric acid, and the vapor evolved collects in iron tubes, into which it is caused to pass by means of a powerful aspirator, and which contains moist coke. The liquid which accumulates contains as much as 8 grams of iodine per litre, in the form of an iron compound (from the tubes), and is precipitated from this as iodide of copper by means of sulphate of copper. Only a small portion of the iodine contained in the phosphorite is at present thus utilized; but the fact that it can be obtained from this source will most effectually prevent any great fluctuation from present prices through the agency of speculators. Arch. Ph., February, 1875, p. 163; J. de Ph. et de Chim.

The discovery of subiodide of copper in Peru has furnished a new and, it is hoped, important source of iodine, and consequently of the indispensable iodide of potassium. Langbein found the mineral to contain 60–66 per cent. of

subiodide of copper, and gives the following process of its conversion into iodide of potassium:

The subiodide is washed to remove soluble salts, is suspended in water, acidulated with muriatic acid, and, with continuous agitation, is treated with sulphuretted hydrogen, until the precipitate is uniformly black. The clear solution, which contains only hydriodic acid and a little excess of sulphuretted hydrogen, is treated with solution of iodine in iodide of potassium, to remove HS, by which a turbid liquid is formed, owing to finely divided sulphur. It is then saturated with carbonate of potassium, evaporated, and the concentrated solution decanted from precipitated sulphur into the crystallizing vats. Ph. Centralhalle, August 6th, 1874, p. 260.

*Recovery of Iodine from Iodoform Residues.*—According to Smitt, the liquid from which the iodoform has been separated by filtration, and which contains iodide, iodate, carbonate, and some formate of potassium, is treated with sulphuretted hydrogen, by which the iodate is converted into iodide; it is then heated, filtered, neutralized with nitric acid, and precipitated with nitrate of lead. The iodide of lead formed is slightly contaminated with formate of lead, from which it is readily freed by washing with water, and may then be utilized as such. Pharm. Jour. Trans., August, 1875, p. 212.

*Iodine.*—The following method of the preparation of iodine from kelp, is extracted from an extract in Am. J. Ph., March, 1875, pp. 128–130, from Philadelphia Drug Exchange Circular, No. 25, and presents, with what is generally known, details of sufficient interest to be incorporated in this report.

The sundried seaweed, collected on the west coast of Ireland and the western islands of Scotland, is incinerated in shallow excavations, at a low temperature; for, if the temperature was allowed to rise too high, a considerable quantity of iodide of sodium would be lost by volatilization. The half-fused ash, or kelp, which remains, is broken into fragments and treated with boiling water, which dissolves about one-half the ash. The liquid thus obtained is evaporated, and in cooling the more crystallizable salts, sulphate and car-



bonate of sodium, and some chloride of potassium, separate. The mother liquor contains the iodide of sodium, and sulphite, sulphide, and carbonate of sodium. The liquor is then mixed with sulphuric acid; carbonic and sulphurous acids escape, and sulphate of sodium, mixed with a precipitate of sulphur, crystallizes out. The supernatant acid liquor is then transferred to the still, is heated, and binoxide of manganese added. The iodine sublimes into condensers, and may be purified by resublimation. The average product of a ton of kelp is about ten (10) pounds of iodine. Besides iodine, kelp yields chloride and sulphate of potassium. Iodine is made in Peru from the mother liquor of the *caliche*, which contains, on an average, about one-third of one per cent. of *iodate* of sodium. While, occasionally, it reaches the markets, from Peru, as pure iodine, it is more usually exported from there as iodide of copper.

*Iodine*.—Dr. F. Mohr recommends the subchloride of copper as a very delicate reagent for the quantitative experiments of iodine. The reagent is best prepared by dissolving the well-washed precipitate of suboxide of copper from glucose determination in chloride of ammonium solution. The concentrated solution so formed becomes turbid on dilution with water, but is readily clarified upon the addition of more chloride of ammonium. The reagent is used in decided excess, and forms a precipitate in iodine containing liquids, when solution of palladium ceases to affect them. The method is not applicable to the determination of copper, as the precipitated subiodide of copper, obtained from solutions containing no excess of copper salt, cannot be collected on a filter; the precipitate passing through the filter with the liquid from which it has been precipitated. Ph. Centralhalle, May 7th, 1874.

*Detection of Iodine in Liquids containing Tannin*.—It is well known that iodine cannot be detected in such liquids by the addition of starch-paste. Tessier recommends the addition of a few drops of solution of a salt of peroxide of iron to the suspected solution, and then to cover the vessel containing it (a watch-glass, etc.) with starch-paper. If iodine is



contained in the suspected liquid it is liberated and evidenced by the bluing of the paper. Ph. Centralhalle, 1875, No. 23, p. 186.

*Iodine.*—Pollacci has found that hyponitric acid vapors produce the bluing of starch-paste, when testing for iodine, much more perceptibly, and with greater certainty, than does nitric acid, even when the latter contains nitrous acid. This he attributes to the fact that nitric acid is apt again to destroy the blue color, as is the effect of bromine, chlorine, and aqua regia. If, for instance, iodine is to be determined in urine, a few cubic centimetres of the latter are mixed with a little starch-paste, and gaseous hyponitric acid is passed into it. Zeitschr. Oest. Apoth. Ver., Feb. 20th, 1875, p. 105.

*Iodide of Potassium.*—Experiments made by Vidau seem to indicate that iodide of potassium solutions are readily decomposed when exposed to the direct rays of the sun. Such solutions, exposed under precisely similar conditions, the one to the action of the sun, the other in a shaded place, were found in the first instance to have become browned, and to affect starch-paper, whereas, in the other, the solution remained unaffected. The action of the sunlight appears the more energetic in proportion as (1) the solution is more concentrated, and (2) the solution is more alkaline. The same results were obtained with starch-paper moistened and exposed as above indicated. It would appear, therefore, that all testings for atmospheric ozone, by the setting free of iodine from iodide of potassium, are liable to be vitiated by grave errors, for in thus estimating the ozone contained in the air the operator at the same time measures the intensity of the sunlight in the medium surrounding the test-papers, which are affected by both causes. Ph. Jour. Trans., Nov. 14th, 1874, p. 383.

J. Personne proposes a modification of Marozeau's old method for the determination of iodide of potassium, which is based upon the fact that when solution of corrosive sublimate is added to a solution of iodide of potassium, the precipitate is redissolved until all the iodide of potassium is converted into iodohydrargyrate of potassium; but an imme-

diate and distinct red precipitate of biniodide of mercury results upon the smallest further addition of solution of corrosive sublimate. The test-liquid is made by dissolving 13.55 grams of corrosive sublimate and 10 grams of chloride of sodium or potassium in sufficient water to make the measure to a litre; and corresponds to a one-tenth normal solution. Its application will be readily understood by those familiar with volumetric analysis. Ph. Centralhalle, No. 24, 1875, p. 193; from J. de Ph. et de Chim.

*Gaseous Hydriodic Acid.*—A. Bannow finds Topsoe's method for the preparation of pure hydrobromic acid available for the preparation of hydriodic acid. Red phosphorus is put in a tubulated retort, and a solution of two parts of iodine in one part of liquid hydriodic acid, of sp. gr. 1.7, is allowed to enter gradually through a dropping-funnel. The development takes place at first without the aid of heat, but after the whole of the iodine has been added heat may be applied. The proportions should be such that iodine and phosphorus may act upon each other according to the formula  $P_4I_6$ . If heat is applied too early a considerable sublimate of iodo-phosphonium is obtained. Ch. News, March 19th, 1875, p. 130; Ber. Chem. Ges., No. 16, 1874.

*Iodic Acid.*—E. Reichardt finds that when iodine is added to a solution of chlorinated lime, iodate of calcium is formed and, if the solution is sufficiently concentrated, readily crystallizes out in a pure condition. The same result is obtained by adding any alkaline iodide to a hypochlorite of calcium (resp. chlorinated lime) solution. He proposes this method for the preparation of iodic acid and the iodates; the process being rapid and convenient, and, moreover, applicable to iodine residues. The iodic acid may be obtained from the iodate of calcium by decomposing it with an equivalent of sulphuric acid. The sulphate of calcium crystallizes out completely and the filtrate yields the iodic acid, upon evaporation, in form of colorless crystals. Arch. Ph., Aug. 1874, pp. 109–111.

*Iodates.*—According to Egidio Pollacci phosphorus liberates

iodine from aqueous solution of iodates, and is itself oxidized to phosphoric acid. He accordingly recommends phosphorus as a reagent for iodates; a fragment of phosphorus, being brought in contact with solution of iodates in a test-tube, accumulating upon its surface small scales of iodine. The free iodine is then demonstrated by starch in bisulphide of carbon in the usual manner. A. J. Ph., Sept. 1874, p. 415; from Jour. de Ph. et de Chim., Aug. 1874.

*Iodide of Sulphur.*—R. W. Emerson Macivor's experiments seem to prove that this compound, obtained by melting together equivalents of sulphur and iodine, is not a chemical combination, but simply a mechanical mixture. It smells strongly of free iodine, and when heated *in vacuo* yields a sublimate composed of almost pure iodine and a residue of sulphur. By means of ether or alcohol the whole of the iodine may be removed from the sulphur, and if its solution in bisulphide of carbon is evaporated the residue shows, under a magnifying-glass, crystals of sulphur and of iodine. Chem. News, Oct. 16th, 1874, p. 179.

#### PHOSPHORUS.

*Phosphorus.*—R. Böttger makes the following observations in regard to solution of phosphorus in bisulphide of carbon: If a few drops of the solution are dropped upon blotting-paper, upon the evaporation of the volatile solvent, the phosphorus is ignited spontaneously and without noise, but if the solution is dropped upon dusty, dry, and finely powdered chlorate of potassium, spontaneous explosion results upon the complete evaporation of the bisulphide of carbon. Ph. Centralhalle, No. 22, 1875, p. 181.

R. W. Cowdrey finds the following to be the solubilities of phosphorus at ordinary temperatures in (1) alcohol, sp. gr. 0.822 = 0.25 per cent., or in a fluid ounce = 0.93 grains; (2) alcohol, sp. gr. 0.835 = 0.18 per cent., or in a fluid ounce = 0.64 grains; (3) glycerin, sp. gr. 1.26 = 0.27 per cent., or in a fluid ounce = 0.96 grains. Its alcoholic solution undergoes oxidation in contact with air, and this is facilitated by light;

it is precipitated by water, but mixes in all proportions with glycerin. The author proposes a tincture of phosphorus, for which see Tinctures, in this report. The Pharm., April, 1875, p. 97.

*Amorphous Phosphorus.*—A. W. Postans, at a meeting of the Pharmaceutical Society of Great Britain, in November, 1874, invited attention to the use of amorphous phosphorus as a substitute for the ordinary kind in medicine. No trials seem as yet to have been made as to its medicinal value, but from a pharmaceutical standpoint its use would be very much preferred, since it is much more readily manipulated. It is readily obtained, as is well known, by heating ordinary phosphorus for a long time (fifty hours) at a temperature of  $460^{\circ}$  to  $480^{\circ}$  in an atmosphere which is unable to act chemically on it. The author confirms the statements that red (amorphous) phosphorus is insoluble in ether, alcohol, proof spirit, chloroform, olive, and cod-liver oils; that it does not become luminous until heated to about  $390^{\circ}$ , and that it has very slight tendency to combine with the oxygen of the air. Hence it is very readily manipulated with powders or in pill form, the exclusion of chlorate of potassium being the only exception. See Pills, in this report. Ph. Jour. Trans., Nov. 7th, 1874, p. 363.

*Sulphobromide of Phosphorus*, the sulphur analogue of phosphoryl-tribromide, was first obtained by Baudrimont, who obtained it by transmitting a current of dry monosulphide of hydrogen through pentabromide of phosphorus. The product of this reaction, however, is always mixed with more or less undecomposed pentabromide, which, according to R. W. Emerson Macivor, may be removed by washing the impure substance with water heated to a temperature of about  $40^{\circ}$  C. ( $= 104^{\circ}$  F.). By this process of washing the pentabromide is decomposed into phosphoric and hydrobromic acids, together with a small quantity of the sulphobromide. The purified substance is then pressed between the folds of bibulous paper, and finally dried in an exsiccator over sulphuric acid, until the last traces of water have been removed. The sulpho-

bromide of phosphorus so obtained is, at ordinary temperatures, a yellowish, crystalline, solid substance; fuses at  $36.4^{\circ}$  C. ( $= 97.52^{\circ}$  F.), and when melted and allowed to cool in a still place, frequently remains liquid for weeks, but if the vessel is shaken, crystallization immediately sets in, and the mass shortly becomes solid. It is soluble in bisulphide of carbon and in ether, and is slowly but completely decomposed by water. Ch. News, March 12th, 1874, p. 116.

*Crystallized Hypophosphorous Acid* may be prepared, according to Jul. Thomsen, as follows: 285 grams of pure hypophosphite of barium is dissolved in 5 litres of water, and is accurately decomposed with an equivalent of sulphuric acid, for which purpose about 101.5 grams of the ordinary concentrated acid is necessary. The mixture, after thoroughly agitating, is allowed to stand until the barium salt has settled, the clear solution is then evaporated at a boiling temperature in a porcelain capsule, until reduced to about one tenth of its original volume, and is then transferred to a platinum capsule. A thermometer is inserted, the evaporation is continued until the temperature rises to  $105^{\circ}$  C. ( $= 221^{\circ}$  F.). Owing to the presence of traces of foreign matter, the liquid, which is nearly a pure hydrate, acquires a little color, which is removed by filtration through a previously washed filter. The filtrate is again subjected to careful heating in the platinum vessel, by which the temperature gradually rises to  $130^{\circ}$  C. ( $= 266^{\circ}$  F.), at which it is kept for ten minutes. It is then allowed to cool, introduced into a stoppered vial, and subjected to a temperature of  $0^{\circ}$  C. ( $= 32^{\circ}$  F.). The acid will then congeal, forming a foliated mass, which contains 98 per cent. of hypophosphorous acid and a little phosphorous or phosphoric acid. At the ordinary temperature the so crystallized acid melts, but solidifies again on placing the vessel containing it in cold water. Ch. Centralbl., No. 34, 1874, p. 531; Ber. Chem. Ges.

*Phosphoric Acid.*—C. Scheibler recommends its preparation for industrial purposes (in the manufacture of sugar) from pure commercial superphosphate of calcium. This is system-

atically exhausted with water in such manner that saturated solutions of superphosphate of calcium are obtained, the weak solutions and washings being used for fresh portions of the superphosphate. Such a solution contains a maximum amount of superphosphate, and a minimum quantity of sulphate of calcium. It is treated with sulphuric acid to liberate the phosphoric acid, and the solution of phosphoric acid is further concentrated by evaporation if desirable. For most purposes the small quantity of sulphate of calcium, still retained by the acid solution, does not interfere; but if desirable this may be removed by means of phosphate of barium. Ph. Central-halle, May 14th, 1874.

The phosphoric acid of the German Pharmacopœia should, according to that standard, not become turbid when it is saturated with sulphuretted hydrogen and is allowed to stand for some time in a closed vessel. Sarrazin finds that, owing to the decomposition of the sulphuretted hydrogen, all phosphoric acid solutions, whether free from arsenic or not, will become turbid on standing, and the precipitation results in concentrated solutions more rapidly than in dilute solutions. In order, therefore, to determine the presence of arsenic in solutions of phosphoric acid, it becomes necessary to determine its presence in the precipitates formed by sulphuretted hydrogen. Arch. Ph., May, 1874, p. 441.

*Estimation of Phosphoric Acid.*—W.W. Stoddart has devised a modification of Liebig's volumetric process for the estimation of phosphoric acid, which seems to be as easy as well as correct method, and preferable on this account to the magnesium method, and, on account of cheapness, to the uranium method. The method of Liebig is based upon the fact, that when a soluble phosphate is mixed with an alkaline acetate and free acetic acid, it is precipitated entirely by ferric chloride. Ferrocyanide was used as an indicator, but with this the results were not sufficiently accurate. Stoddart finds that by substituting sulphocyanide of potassium for the ferrocyanide, the determination by this method is easy; and that it is correct will be seen from the following results:

	Magnesium Process.	Uranium Process.	Sulphocyanide Process.
1. Superphosphate, . . .	46.147	46.171	46.174
2. Ditto, . . . . .	89.165	89.169	89.168
3. Blood Manure, . . .	82.462	82.462	82.465
4. Linassic Coprolite, . .	24.163	24.201	24.200
5. Guano, . . . . .	26.440	26.452	26.454
6. Ditto, . . . . .	82.314	82.820	82.826

It will be observed from the above, that the method proposed is more accurate than the magnesium, and quite as accurate as the uranium method. The solutions required are:

(1.) *Perchloride of Iron*, 24 grams; water, 1 litre; hydrochloric acid sufficient to dissolve any undissolved portion. The titre of this solution is ascertained by solution of

(2.) *Sodic Phosphate*, 50.42 grams; water, 1 litre. One cubic centimetre of this solution = .01 gram phosphoric anhydride.

(3.) *Sodic Acetate*, 100.0 grams; glacial acetic acid, 100.0 grams; water, 1 litre.

The titre of the iron solution (1) having been ascertained, the sample to be examined is dissolved in dilute hydrochloric acid, the solution filtered, a few drops of ammonia added, the precipitate redissolved by acetic acid, and then a quantity of the sodic acetate solution (3) added. This is followed by a few drops of the solution of sulphocyanide of potassium (the indicator), and the solution is then titrated by the iron solution (1), till the creamy color begins to assume a reddish tint. The result is then readily obtained by calculation from the quantity of iron solution (1) used. Proc. Br. Ph. Conf., 1874, p. 539.

*Dilute Phosphoric Acid*, U. S. P.—Mr. Louis Dohme observed that dilute phosphoric acid made from the glacial acid, according to the United States Pharmacopœia, invariably gives precipitates with tinctures of chloride of iron, and finds that this is owing to the presence of pyrophosphoric acid, and perhaps metaphosphoric acid, incompletely converted into tribasic acid. Dilute phosphoric acid, made from phosphorus, according to the United States Pharmacopœia, does not precipitate muriated tincture of iron. See Proceedings, 1874, p. 431.



## BORON.

*Boracic Acid.*—P. Le Neve Foster, Jr., gives an interesting account of the production of boracic acid in Tuscany, from the boiling hot springs and jets of vapor called *soffioni*. The curious phenomena of jets of vapor issuing naturally from the ground is met with over an area of comparatively limited extent, situated between the Massa Maritima and Volterra. These *soffioni*, entering natural springs or ponds, which latter may be (and are now generally) artificial, form the numerous *lagoni*, which stud the hillsides in many of the valleys of the River Cecina. The works at Lardarello are the most important, and a description of the process there conducted will serve for all. The *lagoni* are situated to the south of the village, and consist of artificial basins constructed of coarse masonry, large enough to contain several *soffioni*. At the present time most of the *soffioni* are obtained artificially, by boring, and are lined with sheet-iron tubes ten to twelve inches in diameter. These borings are found more manageable, besides giving out more vapor than those formed naturally. The basins, or *lagoni*, are situated at different levels on the hillside, and the uppermost is supplied with water conducted by a canal from near Bagno del Norbo. After remaining in the basin twenty-four hours, during which time it has been kept in constant agitation by the subterranean vapors, and has become of a slate-blue color, the water passes into a canal and is conducted to another basin at a lower level, where it remains another twenty-four hours, and in consequence takes up an additional quantity of boracic acid. After passing through a chain of such basins (*lagoni*) it has a strength of about 0.50 per cent. of boracic acid, and is then conducted to a very large shallow tank (66' square by 1½' deep) in which it is allowed to settle, and the water leaves the tank in a clean state.

The next operation is to concentrate this weak solution. This is effected by evaporating it in long lead pans, which are about 200' long by about 8 to 10' wide, which are arranged in rows of three under a shed, and are supported on beams over



a low steam passage, into which the vapor is conducted by pipes from the *soffioni*, and thus ingeniously supplies the necessary heat. The pans have a number of divisions placed transversely across them, usually 2' 7" to 3' 4" apart. These divisions are 2" in height, and the pans are arranged so as to have a slight inclination from the end where the solution is admitted towards the other, where there is a large and deep reservoir. The water is allowed to enter in a regulated quantity from the settling tank, and following from one division to another, it gradually evaporates, and after having passed over fifty or sixty divisions it assumes a yellow hue, increasing in intensity as it approaches the end, where it runs into the tank or boiler. Every twenty-four hours this boiler is emptied, its contents being pumped up to the crystallizing house and filled into a series of crystallizing vats, in which it remains four days. The liquid is then drawn off from the crystals, returned to the evaporating house, the vats are again filled with fresh portions of concentrated solution, and the same process is repeated until the vats are filled with crystals of boracic acid. These, retaining a large amount of water, are drained in wicker baskets, and are afterwards spread upon the floor of a drying-house, where they are stirred constantly with wooden rakes until dry. So manufactured, the boracic acid contains about thirteen per cent. of impurities, chiefly sulphates of calcium, ammonium, aluminum, and magnesium. *Ph. Jour. Trans.*, October 31st, 1874, p. 343.

*Borax*.—According to Schulze borax will readily form a solution with an equal weight of glycerin. A mixture of borax and cream of tartar is also readily soluble in glycerin by the aid of moderate heat. *Arch. Pharm.*, February, 1875, p. 149.

#### SILICON.

*Silicate of Potassium*.—Boissi and Berthelot have succeeded in making glass containing 30 per cent. of potash. Its preparation takes place in a flame furnace with an elliptical hearth. 960 kilograms of a mixture, consisting of 630 kilograms of fine dry white sand from Fontainebleau, and 330 kilograms

of purified carbonate of potassium, are heated for four hours to a white heat; the product consists of 845 kilograms of a very homogeneous and colorless or light amber-colored glass. To dissolve this it is necessary to heat it in a Papin's digester, under high pressure, with sufficient pure water (carefully freed from lime salts) to make the resulting solution of 33° to 35° B.; the glass being in a broken up condition. This glass is dissolved very slowly at the temperature of boiling water, so that to dissolve it at 212° F. a long time and a large quantity of water is necessary. At the same time the glass is decomposed, splitting up into free alkali and soluble silicic acid, which is not the case when dissolved under pressure.

Silicate of potassium solution of the above constitution and quality is especially applicable to surgical purposes, and is for this application drawn attention to by Jules Regnault. *J. Appl. Ch.*, October, 1874, p. 149.

*Crystalline Glass.*—In cleansing out a glass furnace certain crystalline goades were found, which had been formed during the cooling of the vitreous mass. Their composition, as determined by Eug. Peligot, is given under No. 1; that of the transparent glass from which those crystals had separated under No. 2; and No. 3 is the glass in its normal condition:

	No. 1.	No. 2.	No. 3.
Silica, . . . . .	62.8	61.8	62.5
Lime, . . . . .	22.7	21.5	21.3
Magnesia, . . . . .	8.4	5.4	5.6
Oxide of Iron, . . . . .	3.2	3.0	3.0
Alumina, . . . . .	2.5	2.1	2.1
Soda, . . . . .	0.9	6.2	5.5
	<hr/> 100.0	<hr/> 100.0	<hr/> 100.0

Hence, it appears that devitrified or crystallized glass has undergone, not a mere physical change of structure, but an alteration in its chemical composition. The increase of magnesia and the decrease of soda are remarkable. The form of crystals approaches that of pyroxen; that is, an oblique but nearly right prism. *Ch. News*, August 7th, 1874, p. 66.

*Hardened Glass.*—The remarkable discovery of De la Bastie,

by which glass is successfully subjected to a hardening process, bids fair to revolutionize some of the branches of the glass industry. De la Bastie found that when glass in a soft condition is suddenly introduced into a cooling medium, at a certain temperature, and is then allowed to cool very gradually to the ordinary temperature, it has acquired extreme hardness, and can no longer be cut by the diamond. Comparative experiments made with ordinary plate glass, 6 millimetres thick, and with "hardened" glass, 3 millimetres thick, show the latter to give many times greater resistance to a blow than does ordinary glass. A hundred grams weight was allowed to fall upon the two samples of glass at different heights, and it was found that the ordinary plate glass was broken when the weight was allowed to drop from a height of 80 centimetres; while the "hardened" glass did not break at a height of 5.5 metres, and broke only when dropped from a height of 5.75 metres. It consequently had offered over seven times the resistance that ordinary glass had of double thickness. The breakage of the "hardened" glass is, however, entirely different from that of the ordinary, which breaks into larger and smaller pieces. It seemed to be divided into very small crystals, showing a change in its molecular composition. Its resistance to heat is quite as remarkable; for it may be heated to redness in an ordinary flame without cracking, and may then be plunged into cold water and again brought into the flame without injury. Ordinary glass, exposed to the flame of a lamp, cracked in twenty-four seconds. The discoverer designates the new glass as *elastic* and *ductile*; but *hardened* seems to be the more appropriate designation. Ph. Centralh., No. 17, 1875, p. 141.

Dr. Alexander Bauer has given some attention to the subject of "hardened" glass, and has made some by a method which he believes to be analogous to that used in France. Plates of glass were heated strongly, until they began to bend, and were then suddenly plunged into a paraffin bath, at a temperature of 200° C. (= 392° F.); the bath being then allowed to cool down slowly. The glass so treated was extremely hard; could not be cut with a diamond; and with

the hardness, its density had also become increased. Its sp. gr. was raised from 2.429 and 2.438 to 2.460 and 2.468. Endeavoring to explain the cause of the hardening, the author refers to the fact that the ultimate constituents of glass, are during the ordinary slow cooling process disintegrated (*entmischt*) to a certain extent. By suddenly cooling it, as is the case in the above process, this disintegration takes place to a far less extent, and consequently the components of the glass are more uniformly combined, and the glass correspondingly harder. The peculiar character of its breakage, which is a drawback to its application for some purposes, is apparently also due to its more homogeneous character. *Ph. Centralh.*, No. 18, 1875, p. 149.

#### CARBON.

*Carbon.*—Monier has found the density of carbon, prepared by heating pure sugar in a close vessel, to be 1.85 times greater than that of anthracite, and that it was so hard as to readily cut glass; its hardness being dependent upon the purity of the sugar. The cohesive power of this carbon is, however, quite weak, and he has, therefore, prepared pencils by mixing the powder with 25–30 per cent. of tar, pressing the mass into a porcelain tube, perforating the mass with a needle to give exit to the gases formed, and then, closing one end, heated the whole to a white heat. The pencils so formed readily scratched glass and even quartz. *Arch. Ph.*, Nov. 1875, p. 476.

*Diamonds.*—Ch. Kopp gives the following specific gravities of the different kinds of diamonds:

- |   |                 |
|---|-----------------|
| 1. Ordinary crystalline diamond, for ornamental purposes, | . 8.550         |
| 2. White diamond, in natural grain,                       | . . . . . 2.636 |
| 3. Black diamond, in natural grain,                       | . . . . . 2.653 |
| 4. Gray diamond of commerce, in fragments,                | . . . . . 8.596 |
| 5. Black artificial diamond,                              | . . . . . 8.412 |

*Ch. News*, Feb. 5th, 1875, p. 61; *Mon. Scientifique*, Dec. 1874.

*Wood Charcoal.*—A. F. Hargreaves has found that when charcoal, obtained from wood by heating in close cylinders, is powdered in twenty-four hours after removal from the cylin-

der, and is then allowed to stand in open vessels to cool, the temperature of the mass increases and culminates in thirty-four hours in combustion. If, on the contrary, the powdering is done three days after the charcoal has been removed from the retort no heating takes place. The author has observed that during the first thirty-six hours after its removal oxygen continues to be absorbed. It is necessary, in order to obtain charcoal of uniform good quality for gunpowder, to maintain a certain uniform temperature. The wood of *Rhamnus frangula* is regarded by the author as of exceptionally good quality for carbonization, and yields 20 per cent. of charcoal. Ph. Centralhalle, June 4th, 1874, p. 184.

*Wood Charcoal.*—Von Reichenbach states that charcoal can be obtained in retorts more abundant and of better quality than if prepared in stacks. The dimensions of the retorts also affect the quality. In small retorts, where the carbonization is rapid, a light and porous charcoal is obtained. In furnaces the carbonization is slow, and the yield of charcoal equals neither in weight nor in density the best obtained by the ordinary process. When wood is slowly distilled, whether in retorts or in furnaces of masonry, the hygroscopic water is first expelled; then follows the pyroligneous acid, which falls in strength after having attained a maximum. Then come the tarry matters, accompanied by combustible gases, after which the carbonization is complete. If the distillation is stopped when the pyroligneous acid ceases to come over, the charcoal obtained is the so-called red charcoal. This imperfectly carbonized wood retains, in a solid form, besides carbon, the bodies, which by their decomposition yield the tars and gases, and it has parted with all the water and with the available acetic acid. This red charcoal yields as much heat in the metallurgical arts as black charcoal, and, moreover, it disengages gases which are useful in such cases, and which, when charcoal is burned in stacks or clamps, are wasted in the air. Wood may be considered as containing 40 per cent. of carbon, 40 per cent. of combined water, and 20 per cent. of hygroscopic moisture. In complete

charring, 100 kilos of hard wood yield 20 kilos of charcoal, 5 kilos of tar, and 5 kilos of acetic acid, besides the gas. In cases of incomplete charring the products are acid, and red charcoal, which in weight exceeds by more than one-half that of the black charcoal from the same quantity of wood, and, being less brittle, bears carriage better. Ch. News, March 20th, 1874; from Bull. de la Soc. Chim. de Paris, 1874.

*Artificial Decolorizing Charcoals.*—According to Melsens the only process which allows of producing artificial decolorizing charcoals, approaching in their properties to boneblack, consists in impregnating woody matters with phosphate of calcium dissolved in hydrochloric acid. The phosphates are thus distributed as they are in natural bones. The mass thus prepared is ignited. The difficulty consists in obtaining products of a sufficient density and mineral richness, and free from foreign salts. The charcoal obtained has to be washed in excess of water, to remove chloride of calcium, if poor coprolites have been employed. The author uses the coprolites found in small granules in the gray phosphatic chalk of Ciply. Ch. News, Oct. 2d, 1874, p. 165; Compt. Rend., Aug. 10th, 1874.

*Bisulphide of carbon* may, according to Yvon, be completely deodorized by the addition of copper turnings. The bisulphide soon loses its color, and has then an ethereal, not unpleasant odor. The process is rapid, economical, and effective. Ch. and Drug., July 15th, 1874.

#### CYANOGEN.

*Hydrocyanic Acid.*—Rennard has found that the forensic determination of prussic acid is possible after a much longer lapse of time than is usually admitted, and confirms, in this respect, the observations of Buchner. He prefers its determination as ferrocyanide of iron to that of sulphocyanide, on account of the stability of the former compound. The author operated by adding to the distillate of a stomach, etc., ammonio-sulphate of iron, solution of potassa, and muriatic acid. The reaction was observable ten and twelve days after the

death of the subject, and even on the fifteenth day was observable by the production of a green color.

In regard to Pagenstecher's guaiacum-sulphate of copper reaction for prussic acid, the author observes that its reliability is affected by the circumstance that traces of tobacco smoke, ammonia, nitro-benzol vapor, etc., produce the bluing of the paper, as well as does prussic acid, and that even perfectly normal blood may produce that effect. The best method for rendering this reaction available, is to evaporate a few drops of the blood on a watch-glass, at a temperature of 25–30° C. (— 77–86° F.), to remove the dry mass from the glass, to powder it, to treat it with dilute sulphuric acid in a test-tube, and, while gently heating, to hold the reagent paper over it. Ph. Centralhalle, No. 49, 1874, p. 401.

*Hydrocyanic Acid.*—According to M. Carey Lea, a proto-salt of iron (*e. g.*, ferrous ammonia sulphate) dissolved together with a uranic nitrate, is a very delicate test for hydrocyanic acid, forming a purple precipitate in very dilute solutions of cyanides. A perfectly distinct reaction is obtained in a solution of potassic cyanide, containing  $\frac{1}{8000}$ th of a grain of anhydrous hydrocyanic acid. The solution of iron and uranium should be quite neutral, and so dilute as to be nearly colorless. A grain or two of each salt may be dissolved in a half ounce of water. Two or three drops of this solution are to be placed into a porcelain capsule, and a drop or two of the liquid to be tested should be made to slip slowly down, that the reaction at the point of contact may be carefully noted. Cobaltous nitrate may be substituted for the uranic nitrate, and gives an almost equally delicate reaction, but the color of the cobalt salt is an objection.

Regarding the *Prussian Blue test*, the author states that its delicacy has been much understated. According to Taylor, it will not detect less than  $\frac{1}{80}$ th of a grain of anhydrous acid; but the author finds that it will detect  $\frac{1}{8000}$ th of a grain. A few drops of a weak solution of a ferrous salt, with a little ferric-ammonium citrate, acidulated with hydrochloric acid, are placed into a porcelain capsule, and a drop of the liquid to be tested is allowed to slip down on the capsule, when a distinct



blue coloration will result. The author ascribes the delicacy of the test to the ferric-ammonium citrate, which he prefers to the ferric-ammonium alum. *Am. Drug. Circ.*, April, 1875, p. 75.

*Hydrocyanic Acid.*—B. S. Proctor has made some comprehensive experiments to determine the best method for its rapid and easy preparation, and for its preservation. He concludes from these that aqueous hydrocyanic acid does not lose by evaporation so rapidly as some recent essayists would have it appear; that the alcoholic solution of the acid loses strength less by evaporation than the aqueous; and that the ethereal acid suffers comparatively little from this cause. The extemporaneous preparation of the acid by the decomposition of cyanide of silver with hydrochloric acid, leaves nothing to be desired, except economy. Crystallized cyanide of potassium, decomposed with tartaric acid, will answer a good purpose; but the author prefers crystallized cyanide of zinc and potassium, and recommends the following formula for the preparation of the officinal acid of the British Pharmacopœia: Water, 1 ounce; cyanide of zinc and potassium, 22 grains; tartaric acid, 49 grains. Dissolve the cyanide in the water, add the acid, allow the precipitate to subside, decant the clear liquor, and preserve it in a corked vial; renew the stock at intervals not exceeding three months. *Proc. Br. Ph. Conf.*, 1874, pp. 554–562.

W. A. Shenstone has made experiments of a similar character, and has found that the more dilute the hydrocyanic acid solution, the better it will keep. He found that when the acid has been reduced by exposure or otherwise to 0.195 per cent. or thereabouts, no further decrease in strength takes place by volatilization. His experiments also prove cyanide of zinc and potassium to be a very stable compound, and that solutions corresponding to 2.0 and 0.199 per cent. respectively, for one month, exposed to direct sunlight and all the variations of temperature during a summer month, kept perfectly unchanged. He therefore suggests a solution of this salt in place of dilute hydrocyanic acid. *Ibid.*, pp. 562–565.

L. Siebold's experiments on the same subject are very simi-



lar in their results, and he recommends that dilute hydrocyanic acid should be made of one-twentieth the present strength; such an acid keeping well, and being more dilute can be dosed more accurately. The author also draws attention to a source of error, not hitherto noticed, in determining the strength of hydrocyanic acid solutions. It is well known that the use of a large excess of alkali, when saturating the acid previous to titration with nitrate of silver, causes an error in the results, since too much of the silver solution will be required to produce a permanent precipitate. But a more serious error is liable to occur from the use of insufficient alkali, and this is the more likely to occur, owing to the fact that solutions of cyanide of potassium (or sodium), containing free hydrocyanic acid, are capable of bluing red litmus. It is, therefore, necessary to use the alkali in slight excess, so that the mixture reacts distinctly alkaline, and to test again at the end of the experiment, when red litmus-paper should be turned blue; in the contrary event the result of the analysis will be inaccurate. To insure accuracy, the author recommends that a rough experiment be made to determine the amount of alkali required. A slight excess of alkali is useful or even necessary. A 2 per cent. acid should be largely diluted to insure a distinct end reaction. Ibid., pp. 565-570.

J. Williams has experimented upon the preservative effect of glycerin on dilute hydrocyanic acid, and although his experiments are not yet altogether satisfactory or conclusive, they seem to point to good effect from a solution containing 15 per cent. of glycerin, and that such a percentage would be as effective as 50 per cent. of glycerin. Ibid., pp. 570-574.

The discussions on the above papers ventilate the subject very completely; see pp. 574-580.

*Diluted Hydrocyanic Acid.*—In a paper containing critical observations on the hydrocyanic acid of the French Codex, A. Gault argues in favor of reducing the strength of this preparation to a half per cent. instead of two per cent., as it is at present. He believes also that greater stability is attained by employing diluted alcohol instead of water, as the

menstruum. A. J. Ph., June, 1875, p. 265; from L'Union Pharm., 1875, p. 36.

(Wittstein, in his "Pharmaceutical Preparations," recommends the use of a portion of alcohol along with water, when making dilute hydrocyanic acid. The suggestion had been followed by me, and in 1866 I read a paper before this Association in which, among other subjects, I referred to the good results of such a modification of the officinal method. See Proceedings 1866, p. 251.—C. L. D.)

*Cyanide of Potassium*.—J. E. Loughlin prepares it pure, for analytical purposes, as follows: The carbonate of potassium is purified by dissolving it in its own weight of water, allowing the solution to settle, and evaporating the clear decanted liquid to dryness. The ferrocyanide of potassium is recrystallized, and completely dried by exposure to gentle heat. Equal weights of the two salts so prepared are intimately mixed, and projected in two successive portions into an iron crucible heated to redness; the mass melts, becomes pasty and of a black color, then limpid and of a light-yellow color, and finally, when the froth becomes white, the process is finished. The heat is now slackened a little, and the clear liquid cyanide is poured through a fine mesh of iron wire into a bright and clean iron pan, avoiding to pour out the pasty deposit of iron which has settled in the crucible. In this manner a quantity of cyanide of potassium (commercially so called and containing 65 to 88 per cent. of cyanide), equal to the weight of ferrocyanide used, is obtained, of a pure white color, very hard, very deliquescent, and presenting a partially crystalline structure upon fracture. From this the pure cyanide is obtained, by percolating it, in a moderately fine condition, with bisulphide of carbon, which leaves all the impurities behind. The solution yields it, upon spontaneous evaporation, in the form of a crystalline mass, containing 97 to 99 2 per cent. of pure cyanide. It may be kept in the condition so obtained, or better, is fused and broken up. An examination of commercial samples of cyanide proved these to contain quantities of real cyanide varying between 56 and 88 per cent. The perfect drying of the salts used and their rapid heating in-

tures a product richer in cyanide than when the ordinary methods are pursued. Am. Ch., May, 1875, p. 396.

*Double Sulphocyanides.*—Mr. William Skey, attributing the bleaching effect of the chlorides of mercury and gold upon sulphocyanide of iron to the formation of double sulphocyanides, has experimented in that direction, and has succeeded in preparing a number of compounds to which he draws attention, preliminary to a more extended treatment of the subject.

*Sulphocyanide of Iron and Mercury* forms in long black prismatic crystals from an ethereal solution of red sulphocyanide of iron and a mercurial salt. The compound is nearly if not quite insoluble in cold water; insoluble in acetic acid, with which the crystals are best washed to remove extraneous matter, but is soluble in alcohol and in ether.

*Sulphocyanide of Iron and Gold*, as obtained from its ethereal solution by spontaneous evaporation, is finely granular, nearly black in color, slightly soluble in water, but freely soluble in alcohol and in ether.

*Sulphocyanide of Mercury and Cobalt* has been obtained by the author in several forms: one in the form of small anhydrous crystals of such intense blue color as to appear almost black by reflected light; another in the form of prismatic crystals of some size and of a paler blue color; and a third variety of a red color, very insoluble in water, obtained by evaporating solution of chlorides of mercury and cobalt with an alkaline sulphocyanide to dryness.

*Sulphocyanide of Mercury and Molybdenum* falls as a flocculent red substance when solutions of the red sulphocyanide of molybdenum and chloride of mercury are mixed.

*Sulphocyanide of Platinum and Ammonium* was obtained by the author in the form of small anhydrous octahedrons, in long prisms and also in flat hexagonal scaly-like masses, when platino-chloride of ammonium was digested with an alkaline sulphocyanide until dissolved, and the solution thus obtained allowed to evaporate spontaneously. These forms of the salt are of a scarlet color and bitter, but an ammonium salt was obtained which is of a brownish-red color, crystallizes in

cubes, is extremely insoluble in water, and is tasteless. Ch. News, July 17th, 1874, p. 25.

#### POTASSIUM.

*Potassa*.—J. Steiner proposes the following simple method of testing for potash: The weighed substance, containing not more than 0.2 grams of potassa, is treated, after dissolving it in a few cubic centimetres of hot water, with a clear concentrated solution of caustic baryta, and heated for about ten minutes. The liquor now contains the alkaline salts and hydrate of barium. By conducting in carbonic acid, and heating afterwards to expel the free carbonic acid, the solution retains the alkaline salts only, a drop of carbonate of sodium determining the completeness of the operation. The filtrate and washings, which need not exceed 250 c.c., are evaporated in platinum on a water-bath, a few cubic centimetres of hydrochloric acid are added, the evaporation continued to dryness, the dry mass redissolved in a little hot water, 1 gram of bichloride of platinum in about 10 c.c. of water is added, and again evaporated to dryness at a temperature not exceeding  $90^{\circ}\text{C}$ . ( $-194^{\circ}\text{F}$ ). The cold residue is treated with alcohol of 80 per cent., the insoluble chloroplatinate of potassium is washed with more alcohol, dried, reduced by heating with a little pure oxalic acid, and the platinum weighed. Ch. News, May 28th, 1875, p. 231.

*Determination of Potassium*.—G. Krausse gives the method pursued at Stassfurt for the determination of potassium by means of bichloride of platinum. 10.0 grams of saline mixture (chlorides), are dissolved in 250.0 grams of water, and the solution is filtered; 10 c.c. of this solution, corresponding to 0.4 grams of the mixture, are placed into a porcelain capsule, an excess of solution of bichloride platinum is added, and evaporated to dryness. The dry mass is moistened with a few drops of water, just sufficient to make it granular, and the capsule is allowed to cool rapidly. The residue is then rubbed with 2 or 3 c.c. of alcohol of  $90-95^{\circ}$ , allowed to settle, decanted on a filter which has been dried at  $120-130^{\circ}\text{C}$ . ( $-248-266^{\circ}$

F.), weighed, and moistened with a little alcohol. The washing with alcohol by decantation is continued until the filtrate passes colorless, and no longer gives a reaction with nitrate of silver. The residue is then carefully washed into the filter, allowed to drain, expressed gently with blotting-paper, dried for half an hour at a temperature of  $120^{\circ}$  to  $130^{\circ}$  C. ( $-248-$  $266^{\circ}$  F.), and then immediately weighed. The platino-chloride of potassium so obtained is perfectly free from the corresponding sodium, magnesium, calcium, and barium compounds that may have been present, and gives the data from which the percentage of potassium may be readily ascertained. The author gives in his somewhat lengthy paper the reason why it is desirable and necessary to manipulate precisely as he describes. Arch. Ph., November, 1874, p. 407.

*Carbonate of Potassium*, contaminated possibly with a little nitrate of potassium, but otherwise quite pure, is obtained by J. Lawrence Smith, by mixing together 50 grams of nitrate of potassium and 100 grams of oxalic acid (both purified from the commercial article by several crystallizations), placing the mixture into a platinum capsule, adding a small quantity of water, evaporating over a gas-burner to near dryness, again adding water, evaporating to dryness, and heating, finally, to redness. During the evaporation to dryness, the nitric acid is almost completely expelled, and on heating to redness the oxalate formed is decomposed and converted into carbonate. Am. J. Ph., January, 1875, p. 32; from Am. Chem, October, 1874.

*Chlorate of Potassium*.—Mr. Henry W. Lindemeyer draws attention to the so-called *French* and the granulated or purified chlorate of potassium of commerce, and reminds his pharmaceutic brethren that there is no operation more readily or economically carried out than the recrystallization of this salt. The commercial salt is simply dissolved in twice its weight of boiling distilled water, filtered while hot through paper, and allowed to cool; 15 ounces out of every 16 ounces used are thus obtained in a recrystallized form, and when dry resembles the so-called *French* article. The mother liquors

are readily utilized for gargles, etc. *The Pharmacist*, September, 1874, p. 261.

*Chlorate of Potassium* has been found, by A. Hilger, contaminated by lead; in some cases even when designated chemically pure. Its presence is readily detected by HS, or by neutral chromate of potassium, and it is readily removed by repeated crystallization. *Arch. Ph.*, May, 1875, p. 391.

#### SODIUM.

*Sodium*.—To preserve metallic sodium with a brilliant surface R. Röttger recommends that it be placed in a vessel with alcohol until a pure metallic surface is produced; it is then rapidly introduced into a second vessel containing petroleum ether, and from this it is transferred into a third, containing a saturated solution of chemically pure naphthalin in petroleum ether; in which medium it will keep unchanged. *Ph. Centralh.*, No. 7, 1875, p. 50.

*Caustic Soda*.—Viedt is of the opinion that *common salt* may be converted into caustic soda by the action of steam at a high temperature, hydrochloric acid being liberated. As yet his experiments have not been successful, owing to imperfections in the apparatus employed. Hydrochloric acid was, indeed, formed, and he is confident that means will be found for accomplishing this important reaction. If his views are correct one more revolution may be expected in the alkali manufacture. *Jour. Appld. Ch.*, April, 1875, p. 55.

S. Cabot, Jr., communicates the results of his experiments in this direction, which, as yet, are not successful as to yield. The apparatus used was a cylindrical stove made of cast-iron pipe, and so arranged that all the doors and the top could be closed by iron flanges, and air admitted below the grate through a tube, while the products of the decomposition could be taken out above by another. A hot anthracite fire was kindled (without the use of wood, to prevent any alkaline ashes), and a stream of mixed air and steam was blown in by a very simple little tin injector, formed by inserting a fine jet of steam halfway into an open cone of tin in the shape of

a funnel. The writer has found by experience that a fire may be kept alive for a long time by the blast of mixed air and steam resulting from such an injector, and believes that, by passing the blast through a sufficiently long iron tube, the air would be sufficiently dry to support combustion for an indefinite length of time, and might be used with advantage in many cases where a blast is required. In this case, however, the steam was a more important ingredient than the air. While the fire was still very hot, and the blast passing through it, about a pound of salt was thrown in at the upper door, which was quickly closed. Volumes of hydrochloric acid streamed from the upper tube, and were collected in water and tested. The ashes were found to be alkaline, but the yield did not approach the theoretical quantity, and could not be applied as a technical process. Ch. News, June 4th, 1875, p. 243.

*Carbonate of sodium* is obtained in a chemically-pure condition, by J. Lawrence Smith, by first obtaining a perfectly pure oxalate of sodium, and heating this in a platinum crucible at a very high temperature (to the fusing-point, if possible). The oxalate is obtained by mixing solutions of 68 grams of oxalic acid (recrystallized from commercial acid), and 143 grams of sal soda, in 200 grams of water, heated just enough to prevent immediate crystallization. The crystals obtained are collected on a filter, and are washed over a Bunsen's aspirator with about half a litre of water, and dried; about 30 grams of dry oxalate being produced, which yields about 23 grams of fused carbonate. Am. Jour. Ph., Jan. 1875, p. 31; from Am. Chem., Oct. 1874.

*Determination of Monocarbonate in Alkaline Bicarbonate.*—The following method, recommended by A. Mebus, gives excellent results: Two equal quantities of the salt are weighed, and the total quantity of alkali is determined in one of them by the usual method. The solution of the second part is mixed with a quantity of solution of soda, perfectly free from carbonic acid, equal to that found in the first part, by which the bicarbonate is converted into monocarbonate. The solu-



tion is then precipitated by chloride of barium or chloride of calcium, when, if the salt has consisted of bicarbonate only, the solution contains only chloride of the alkali; on the other hand, if it contained monocarbonate, the corresponding quantity is found in the solution, which is determined by titration with normal acid, and being deducted from the total quantity of alkali found gives the figures from which the quantity of bicarbonate is readily calculated. The data accompanying the author's paper leave no doubt of the correctness of the method. *Schweiz. Wochenschr.*, May 21st, 1875, p. 171.

*Hydrate of Nitrate of Sodium.*—Ditte finds that nitrate of sodium, like nitrate of lithium, forms at a low temperature a compound with water. If a solution saturated, at zero C. ( $-32^{\circ}$  F.), is plunged into a freezing mixture, at  $13^{\circ}$  C. ( $8.6^{\circ}$  F.), it remains liquid in spite of agitation and the presence of crystals of nitrate of sodium contained in the tube. The melting-point of the hydrate ( $\text{NaO}, \text{NO}_3, 14\text{HO}$ ) being below the temperature of the freezing mixture it remains liquid. Nitrate of potassium, under the same conditions, becomes a solid mass in a few moments. *Ch. News*, June 4th, 1875, p. 250; from *Compt. Rend.*, May 8d, 1875.

*Chili Saltpetre.*—According to an author, in the *Polyt. Centralblatt*, the yellow color of Chili saltpetre is due to the presence of bichromate of potassium, and the violet color of certain pieces to nitrate of manganese. Iodine is also present in the ordinary Chili saltpetre in the form of the iodates of potassium and sodium; but in the absence of potassa the iodine is present as periodate of sodium. *Ph. Centralhalle*, No. 51, 1874, p. 418.

*Kanawha Salt.*—E. Scheffer has found chloride of barium to be a constituent of some samples of Kanawha salt, and absent in others. The presence of chloride of barium as a *natural* constituent of this salt is very interesting in a geological aspect, since there are but few waters known in which baryta is found in solution. *Am. J. Ph.*, June, 1875, p. 247.



## CÆSIUM.

*Cæsium*.—J. P. Sharpless proposes stannic chloride as a reagent for distinguishing cæsium from the alkaline metals. Upon the addition of stannic chloride and concentrated muriatic acid to solutions of chloride of cæsium an insoluble double salt is formed, while the double chlorides of the other alkaline metals are all soluble in muriatic acid. The rubidium compound is the least soluble of these, but not to a degree interfering with the value of the reaction. Ammonium must, however, not be present, as its chloride forms a very difficultly soluble precipitate with the same reagent. Ph. Centralhalle, May 21st, 1874, p. 161.

Upon the basis of the above reaction Sharpless prepares cæsium from lepidolit. The latter, in fine powder, is heated with hydrofluoric acid until it is completely decomposed. The hydrofluosilicic and excess of hydrofluoric acid are driven off by heating the mixture gently with hydrochloric acid, and the mass is then treated with hot water, the solution filtered, concentrated to a small bulk, and concentrated hydrochloric acid added. If upon the latter addition a precipitate is produced, sufficient water is added to redissolve it. The solution is then treated with solution of stannic chloride, carefully avoiding an excess. The double salt precipitates, and may be purified by dissolving it in water, and precipitating with hydrochloric acid. It is then again dissolved in water, the tin is precipitated by means of sulphuretted hydrogen, and upon filtration and evaporation chloride of cæsium is obtained, from which the other salts are readily prepared. Ibid., May 28th, 1874.

## AMMONIUM.

*Ammonia*.—Since the year 1870 the use of sulphate of ammonium for agricultural purposes has increased to a remarkable extent, and the technical as well as the commercial development has kept pace with the increased demand. M. Seidel, in his official report on this branch of industry at the Vienna Exhibition, gives some interesting information, of

which an abstract is published in the *Deutsche Industrie Zeitung*. The most important source of ammonia, in comparison with which all others are insignificant, is the ammoniacal water of the gas-works. This liquid, which collects partly in the condensers and partly in the scrubbing apparatus, consists of a solution of volatile and fixed ammonia compounds in variable proportion. The first consist of sulphide, carbonate, and free ammonia; the latter are chiefly the sulphocyanide and hyposulphite of ammonium, with traces of sulphate and chloride. The quantity of ammonia compounds in the liquor varies greatly, but the manufacturers now furnish a liquor containing more than it did formerly. The treatment of these liquors is now almost always as follows: The ammonia gas is driven out by distilling the liquor in iron boilers, which are heated by direct fire or by superheated steam; sometimes a current of air is also blown into the warm liquid. In some English works an apparatus is employed which resembles a gas-scrubber; the ammonia liquor flows in above, while high pressure steam is admitted below. In some manufactories the ammonia vapor is conducted through very long Liebig's condensers, and finally through tubes filled with charcoal into receivers, and is thus obtained free from empyreumatic matter. In others the gaseous ammonia is conducted into sulphuric acid absorbers.

The author draws attention to the various industrial uses of ammonia. Large quantities of caustic ammonia are daily required for Carre ice machines, and it finds extensive application in the preparation of dye-stuffs. Quite recently an unexpected use has been found for it in the preparation of indigo in Java; J. Sayers, a Belgian chemist, having introduced a new method of preparation, in which ammonia is used in place of lime, and a purer dye thus obtained. The well-known fact that certain salts are capable of absorbing large quantities of ammonia gas, is also about to be applied to storing ammonia for ready use in the gaseous condition, gentle heating dissociating the gas in a dry condition from the salt. Thus chloride of calcium is capable of absorbing and retaining 50 per cent. *Sulphide of ammonium* is, by Spence, pro-

posed to be prepared on a large scale by subjecting a mixture of sulphate or chloride with soda residue or gas-lime to the action of steam, and condensing the products of distillation in suitable coolers. *Carbonate of ammonium*, which heretofore has been prepared by decomposing sal ammoniac with carbonate of lime, is now proposed to be prepared by substituting for the latter carbonate of barium, thus securing a valuable by-product. J. Appld. Ch., May, 1875, p. 69.

The presence of tarry matter in commercial ammonia is best determined, according to Kupfferschläger, by adding the suspected ammonia solution, drop by drop, to a few cubic centimetres of colorless nitric acid which has been diluted with one-fourth its volume of water, and is contained in a test-tube. If the ammonia contains tarry products it will invariably contain anilina and toluidina, and a red color will therefore be produced after a short time, which upon further addition of ammonia will gradually pass to brown. At the same time the vapors, which are evolved by the heat of the reaction, will be plainly odorous of tar. Sulphuric or muriatic acid will also answer for the test, but not as well as nitric acid. Ph. Centralhalle, No. 24, 1875, p. 194.

According to Wittstein, nearly all commercial ammonia, being made from gas liquor, contains small quantities of anilin, toluidin, etc., and these compounds enter into all combinations into which the ammonia enters. If nitric acid is partially neutralized with liquor ammonia containing these compounds, the liquid acquires a rose or deeper red color, which disappears again when the ammonia is added to supersaturation. The color is not observed if the ammonia is added at once in excess. A. J. Ph., Feb. 1875, p. 64; from Polyt. Jour., Oct. 1874.

*Nitrite of Ammonium* has been obtained by Berthelot in form of a white, crystalline, but tough and elastic mass, by double decomposition between nitrite of barium and sulphate of ammonium, and evaporation in vacuo. Its well known decomposition into nitrogen and water, takes place readily even at ordinary temperature, and the unchanged portion is then dissolved by the water formed. It is therefore necessary to keep

a hygroscopic body, such as burned lime, in the vessel in which it is to be preserved. The salt may be prepared as a simple lecture experiment by passing simultaneously into a glass balloon oxygen, ammonia, and nitric oxide. Nitrite of ammonia is formed and deposited in the upper part of the balloon. Arch. Pharm., April, 1875, p. 863; J. de Ph. et de Chim.

#### BARIUM.

*Metallic Barium.*—This metal is usually obtained in a pure state by the decomposition of chloride of barium by means of a strong galvanic current; but this method, requiring a powerful galvanic battery, is very expensive. Sergius Kern tried several other methods: (1) by strongly heating oxide of barium with metallic potassium, extracting the metallic barium by mercury, and distilling off the latter; (2) by double decomposition of an excess of chloride of barium in concentrated aqueous solution, with sodium amalgam, and distilling the mercury from the barium amalgam; and (3) by decomposing pure iodide of barium with metallic sodium. This latter method the author prefers, and he gives the following directions for preparing the

*Iodide of Barium:* Iodine is allowed to act upon hydrate of barium in water by the aid of the slight heat of a spirit-lamp. Iodide and iodate of barium are formed; the latter is decomposed into iodide by sulphuretted hydrogen, the solution is filtered from the sulphur, and is evaporated and dried. With the salt so obtained, the metallic barium is readily made by mixing it in the powdered state with an equivalent of sodium, throwing the mixture into a covered crucible and heating, by which strong reaction, accompanied by light, results. From the mixture so obtained the pure barium is extracted by mercury, and the mercury distilled from the amalgam. In his studies upon the metal, the author observed a strict analogy between the metallic barium and calcium. The difficulty of obtaining pure metallic strontium is an obstacle to the study of its properties. Ch. News, June 4th, 1875, p. 243.

*Sulphocarbonate of Barium.*—P. Thenard finds that when sulphide of barium is agitated a few minutes with bisulphide of carbon, a very dense light-yellow, crystalline precipitate of pure sulphocarbonate of barium is obtained. This reaction may be very advantageously applied to the production of this salt, the details of which the author has given in his paper. Ch. Centralbl., No. 42, 1874, p. 664; Compt. Rend., 79, 673.

#### CALCIUM.

*Lime.*—Pavesi and Rotondi have determined the solubility of lime in water, and find that to dissolve 1 part of lime, 785 parts of water at 13° C. (= 55.4° F.), 806 parts at 19.5° C. (= 67.1° F.), and 814 parts of water at 23° C. (= 73.4° F.) are required. Dalton had found 1 part of lime to be soluble in 778 parts of water at 16° C. (= 60.8° F.), and Bineau, 1 part in 780 at 18° C. (= 64.4° F.). Ch. Centralbl., No. 30, 1874, p. 467; from Ber. Chem. Ges., No. 7, 1874.

*Phosphate of Calcium* may be obtained, according to A. Vogel, in paying quantities as a by-product in the manufacture of glue. The fresh bones are in the glue factories usually treated with hydrochloric acid, which dissolves the phosphate of calcium and leaves the glue substance undissolved. The acid liquid is then usually neutralized with excess of caustic lime or carbonate. The dried substance so obtained contains, according to an analysis of Kalvoda, 18 per cent. of phosphorus, corresponding to 40 per cent. of phosphate of calcium, and could consequently be used advantageously as a fertilizer. N. Rep. Ph., 1874, No. 5, p. 264.

*Superphosphate of Calcium.*—Adolf Ott has had opportunity of observing the method of preparing the superphosphate of calcium at the Rumford Chemical Works, for making Horsford's Baking Powder, and describes the method as follows: Bones are pounded to a coarse powder, carbonized in retorts, and sifted. Five grades of boneblack are thus obtained, the two coarsest grades being sold as such; the two next grades are used for the phosphoric acid powder, while the finest made is used for making common superphosphate. The two medium grades

of boneblack are calcined with excess of air, and then digested, with mechanical stirring, in enamelled vessels, for eighteen hours with sulphuric acid. After the sulphate of calcium formed has been allowed to deposit, the solution is filtered through felt bags, and is evaporated in cast-iron enamelled vessels, until it has reached the desired sp. gr. It is then allowed to stand over night, when a curdy, hygroscopic mass is deposited, which is mixed with pure starch, at first by hand and then under granite rollers; it is spread out to dry for eight to ten days, and is then transferred to a drying-room until completely dry. Finally, it is ground, sifted, and packed. Ph. Centralhalle, No. 40, 1874, p. 335.

*Gypsum*.—Ed. Laudrin finds that gypsum sets most rapidly when it contains 20 per cent. of water. Slowness of setting may be produced by means of an excess of water, or more conveniently by gum, glycerin, gelatin, mallow powder, etc. Inert bodies, such as sand, sulphate of barium, and oxide of iron, do not serve the same end. Chem. News, October 30th, 1874, p. 206; Compt. Rend., September 14th, 1874.

#### MAGNESIUM.

*Determination of Magnesia*.—A. Millot and Maguene find that when an excess of magnesium salt is added to a solution of ammonio-magnesian phosphate in citrate of ammonium, the whole is precipitated. This shows the impossibility of determining magnesia in the state of ammonio-magnesian phosphate in solutions containing citric acid. Ch. News, May 28th, 1875, p. 240; Bull. Soc. Chim. de Paris.

*Carbonate of Magnesium*.—Wittstein has observed that the alkaline borates have the property of dissolving carbonate of magnesium. The precipitate, obtained by the addition of carbonate of potassium to a solution of sulphate of magnesium, is dissolved upon the addition of a concentrated solution of borax, and is retained in solution in the cold, but when heated it again precipitates, to be redissolved upon the cooling of the solution. Arch. Pharm., January, 1875, p. 40.

*Sulphite of Magnesium*.—Hager recommends the following

method of its preparation: One part of clean carbonate of magnesium is suspended in seven to eight parts of distilled water, and sulphurous acid, prepared by heating concentrated sulphuric acid and coarsely powdered wood charcoal, is passed into the thin magnesia-milk to supersaturation; the gas-tube not entering too deep into the mixture, which must be gently agitated occasionally. The liquid, which contains a heavy crystalline deposit, is now removed, and magnesia is added in small portions until it is nearly saturated. The crystalline deposit is then washed by decantation, time not being allowed for the crystals to separate completely, so as to remove a grayish matter resulting from impurity in the magnesia, the decanted liquid being reserved and utilized subsequently. The salt is then collected on a funnel, loosely stopped with filtering-paper, drained at a moderate heat, and placed in well-stoppered bottles. The decanted liquid contains a portion of the salt as deposit and in solution; the former is again carefully separated by decantation, the latter by evaporation and crystallization. So obtained, the compound corresponds to the formula  $\text{MgO}, \text{SO}_2 + 6\text{H}_2\text{O}$ , and is soluble in 80 parts of water at a moderate temperature, and in 120 parts of boiling water. It is consequently more soluble in cold than in boiling water. Ph. Centralhalle, No. 1, 1875, p. 1.

*Selenite of Magnesium.*—Dr. Hilger finds that when selenious acid is treated with chloride of magnesium and ammonia, in presence of chloride of ammonium, a crystalline precipitate is produced, which is composed of selenite of magnesium to which ammonia adheres very tenaciously. The latter cannot be entirely removed, even by prolonged washing. The composition of the selenite of magnesium, so obtained, corresponds to the formula  $\text{SeO}_3, \text{Mg}, 7\text{H}_2\text{O}$  ( $\text{O} = 16$ ); the ammonia adhering mechanically. Berzelius had described a selenite of magnesium, with  $3\text{H}_2\text{O}$  ( $\text{O} = 16$ ), which he had obtained by neutralizing selenious acid with carbonate of magnesium. The compound obtained by Hilger shows a crystalline structure identical with that of ammonio-phosphate of magnesium. It is sparingly soluble in water, but readily so in acetic and mineral acids. The salt cannot be entirely deprived of seleni-



ous acid by heating to redness, as had been already observed by Berzelius with his compound. After such heating, from 18 to 19.5 per cent. selenite of magnesium remains undecomposed, and the residue contains besides selenious some selenic acid. *Zeitschr. Anal. Chem.*, No. 4, 1874, p. 394.

#### BERYLLIUM (GLUCINUM).

*Beryllium and its Compounds.*—A. Altenberg has made some very interesting researches on beryllium and its compounds, with results which partly confirm and partly contradict previous views.

*Beryllia* ( $\text{BeO}$ ) is proved to be a weak base, forming basic salts very readily, the composition of which is very changeable. The statement of Schaffgott that beryllia, when heated to redness with an alkaline carbonate, drives out carbonic acid, is an error, as is also Debray's statement, that the earth is readily soluble in melting alkali.

*Hydrate of Beryllium* has at  $100^{\circ}\text{C}$ . ( $= 212^{\circ}\text{F}$ .) the formula of  $\text{BeO},\text{HO}$ ; when precipitated from solution by ammonia, its formula is  $\text{BeO},\text{HO} + 7\text{HO}$ ; when separated from alkaline solution by boiling,  $3(\text{BeO},\text{HO}) + \text{HO}$ .

*Ferrocyanide of Beryllium.*—Sulphate of beryllium is not precipitated by ferrocyanide of potassium, but, when heated, Prussian blue is deposited. Upon the addition of ammonia, however, a basic ferrocyanide of beryllium is obtained, which is colorless.

*Nitrate of Beryllium* was not obtained by the author of definite composition, a basic salt being formed during the evaporation.

*Chlorate of Beryllium* is decomposed even more rapidly than the nitrate.

*Perchlorate of Beryllium* is obtained in the form of needle-shaped, deliquescent crystals.

*Periodate of Beryllium* is nearly insoluble in pure water.

*Sulphate of Beryllium* has the composition of  $\text{BeOSO}_4 + 4\text{HO}$ , and loses one-half of the  $\text{HO}$  at a temperature of  $100^{\circ}\text{C}$ . ( $= 212^{\circ}\text{F}$ .).

*Phosphate of Beryllium*, of the composition  $3\text{BeO},\text{PO}_4 + 7\text{HO}$ ,



was obtained by precipitating sulphate of beryllium with ordinary phosphate of sodium. This result is in direct contradiction with Scheffer's observation, who claimed to have obtained an acid phosphate by using a solution of the nitrate which had been evaporated at a temperature of  $120^{\circ}$ – $150^{\circ}$  C. ( $= 268^{\circ}$ – $322^{\circ}$  F.). According to the author's experiments, such a nitrate must necessarily be basic.

*Oxalate of Beryllium* was obtained in the form of basic compounds, one soluble and the other insoluble. The neutral oxalate, as well as the succinate and tartrate, crystallize with great difficulty from syrupy solution.

Finally, the author has collected data which render it probable that beryllia should be regarded, as had been formerly, a sesquioxide of beryllium; but to determine this positively, it will be necessary to determine the specific heat of the metal. *Zeitschr. Anal. Ch.*, No. 3, 1874, p. 316.

*Platino-chloride of Glucinum*.—By mixing the concentrated solutions of the two chlorides, A. Welkow has obtained this compound in the form of yellow hygroscopic crystals, which are readily soluble both in water and alcohol, but insoluble in ether. The composition of this compound is  $GPtCl_6 + 8H_2O$  ( $O = 16$ ), assuming  $G = 9.4$ . If heated to  $100^{\circ}$  C. ( $= 212^{\circ}$  F.), there is a loss of water; from  $100^{\circ}$  to  $150^{\circ}$  C. ( $= 212^{\circ}$  to  $302^{\circ}$  F.), there is no change; but above  $150^{\circ}$  C. ( $= 302^{\circ}$  F.), water again escapes and the compound is destroyed. *Chem. News*, January, 1874; from *Ber. d. D. Ch. Ges.*

#### ALUMINUM.

*Oxide of Aluminium* in the presence of hydrated peroxide of iron is, according to Macivor, most rapidly determined indirectly in the following manner: The oxides of aluminium and iron are thrown down from solution in the ordinary manner by the addition of solution of ammonia, and the precipitate is collected on a filter, dried, ignited, and weighed. The ignited precipitate is then rubbed to a fine powder in an agate

mortar and carefully washed into a long-necked flask. Metallic zinc (quite free from iron) is next added to the contents of the flask, and finally some sulphuric acid. The whole is then heated until the oxides have dissolved. The quantity of iron in the fluid is then estimated volumetrically by the permanganate of potassium process; from the iron found, the quantity of peroxide of iron is ascertained, and this amount, subtracted from the total weight of the mixed oxides, gives the quantity of oxide of aluminium contained in the mixture. *Ch. News*, May 8th, 1874.

C. Jehn and E. Reichardt have determined that when alumina is precipitated by borax, and the precipitate is completely washed, pure alumina only remains. In the methods generally recommended in analytical text-books (Gmelin, Rose, etc.) it is recommended that the alumina be determined as borate, and, in order to avoid the decomposition of the borate by these methods, it is recommended to express the precipitate without washing it, or to subject it to but partial washing. The authors determine that by these methods variable compounds of boric acid and alumina are obtained, and that therefore complete washing of the precipitate, and its determination as alumina, will lead to more accurate results. *Arch. Ph.*, August, 1874, p. 125.

*Clay.*—Mr. William Durham has made some interesting experiments on the power of water and of solutions of acid and of carbonate of sodium of various densities, to retain clay in suspension. The experiments were made in jars of about a pint capacity, and on each a numbered label was gummed, looking inwards, so that on looking through the jar the number could be read when the contained liquid was clear enough. A weighed quantity (10 grains) of fine white clay was added to the liquid contained in each jar, and the time was then noted which each solution took to clear sufficiently to allow the number of the label to be seen through it. The following remarkable results were obtained:

	Density.	Time of Clearing.	
		Hours.	Min.
Water only, . . . . .	1000	86	0
“ with 2 drops of acid, . . .	1000	0	30
“ with sulphuric acid, . . .	1024	1	30
“ “ “ . . . . .	1048	5	0
“ “ “ . . . . .	1098	10	0
“ “ “ . . . . .	1440	86	0
“ with 1 grain carb. sodium, . . . .		96	0
“ 5 grains, . . . . .		112	0
“ 9 “ . . . . .		98	0
“ 20 “ . . . . .		46	0
“ 30 “ . . . . .		22	0
“ 200 “ . . . . .		4	0

As the result of many experiments, the author finds that every kind of solution has a specific capacity of sustaining clay, which capacity varies in a specific manner, according to the strength of the solution. Chem. News, August 7th, 1874, p. 57.

*Saponit.*—Landerer draws attention to this argillaceous earth, which is found in great abundance on the Grecian islands of Mylos and Argentiera. It is exported under the name of *Saponochoima* in immense quantities, after having been cut into pieces resembling soap, as a substitute for which it is used for many purposes. It contains, besides silica and alumina, only traces of oxide of iron and also some potassa, and is of a white color. Landerer finds that this material is readily decomposed by *hot* sulphuric acid, and therefore suggests its eventual importance in the manufacture of alum. Several other varieties of clay, useful for this purpose, may also be obtained on Mylos. N. Rep. Ph., No. 6, 1874, p. 373.

#### THORIUM.

*Thorium.*—Cleve has examined, and described the oxide, normal hydrate, chloride, potassio-chloride, chloro-platinate, silico-fluoride, platino-cyanide, ferrocyanide, sulphocyanide, nitrate, perchlorate, chlorate, bromate, and iodate of thorium; the carbonate of thorium and sodium; sulphate of thorium and ammonium; the sulphite, hyposulphate, seleniate, two other phosphates; and the pyrophosphate; pyrophosphate of

thorium and sodium; the formiate, acetate, and oxalate; oxalate of thorium and potassium; tartrate; and the tartrate of thorium and potassium. He has determined that thorium is not isomorphous with any element. Chem. News, March 20th, 1874; from Bull. de la Soc. Chim. de Paris.

#### YTTRIUM.

*Yttrium*.—Cleve has prepared, examined, and describes the ammonio-carbonate, potassio-sulphate, acetate, chloroplatinate, chloro-aurate, formiate, seleniate, potassio-seleniates, and ammonio-seleniate of yttrium; and the compound of sulphocyanide of yttrium with cyanide of mercury, in Bull. de la Soc. Chim. de Paris, April 20th, 1874; Ch. News, July 10th, 1874.

#### ERBIUM.

*Erbium*.—Cleve has prepared, and describes in Bull. de la Soc. Chim. de Paris, April 20th, 1874, the acetate, chloroplatinate, chloro-aurate, chloro-mercurate, basic nitrate, formiate, seleniate, potassio-seleniate, ammonio-seleniate, ammonio-sulphate, sodio-sulphate, and the sodio-carbonate of erbium, and the compound of sulphocyanide of erbium with cyanide of mercury. Ch. News, July 10th, 1874.

#### LANTHANUM AND DIDYMIUM.

*Lanthanum and Didymium*, and their compounds, have been the subject of comprehensive research by Fr. Frerichs. Operating upon a mixture of the oxides of the two metals, obtained from cerite, he separated them by two methods. The first of these is dependent upon the different behavior of their oxychlorides, obtained by the action of chlorine and heat upon the oxides by water. These oxychlorides have the composition of  $2\text{LaO} + \text{LaCl}$  and  $2\text{DiO} + \text{DiCl}$  respectively. The oxychloride of lanthanum is not changed by boiling with water, while the didymium compound is split into chloride and oxide. But if the two are together, then the chloride of didymium yields its chlorine to the oxychloride of lanthanum, and chloride of lanthanum and hydrated

oxide of didymium are formed. The second method depends on the greater affinity of sulphuric acid for lanthanum than for didymium. Under these circumstances the relative quantities of the two oxides must be approximately known, however. Accordingly, whether it is desirable to obtain the lanthanum or the didymium from the mixture, sulphuric acid is added either just short, or in slight excess, of the quantity of oxide of lanthanum contained in a solution in nitric acid, and the solution is then evaporated to dryness and the residue heated gently to redness. In the first case pure sulphate of lanthanum is dissolved, and oxide of didymium containing oxide of lanthanum remains; in the second the solution of sulphate of lanthanum is contaminated by sulphate of didymium, and pure oxide of didymium remains, and readily furnishes pure sulphate by solution in sulphuric acid, as has been determined experimentally by the author. The author's results of his examination of the compounds of the two metals are given in the following:

### 1. *Lanthanum Compounds.*

*Oxide of Lanthanum* ( $\text{LaO}$ ) possesses the properties usually attributed. An oxide containing more oxygen was not observed with certainty.

*Oxychloride of Lanthanum* ( $2\text{LaO} + \text{LaCl}$ ) has heretofore not been described; is produced by heating the oxide at a temperature of  $200^{\circ}\text{C}$ . ( $412^{\circ}\text{F}$ .) in a current of chlorine, the reaction being accompanied by flame; a grayish-white mass, from which water only dissolves traces.

*Sulphate of Lanthanum* ( $\text{LaO},\text{SO}_3 + 3\text{HO}$ ). Colorless crystals.

*Phosphate of Lanthanum* ( $2\text{LaO},\text{HO},\text{PO}_3$ ); a gelatinous precipitate.

### 2. *Didymium Compounds.*

*Oxide of Didymium* ( $\text{DiO}$ ); possesses the properties usually given.

*Sesquioxide of Didymium* ( $\text{Di}_2\text{O}_3$ ). The formula is contradictory of that heretofore given, according to which it

would be  $\text{Di}_{32}\text{O}_{33}$ . It is obtained in the form of a brown mass by heating the nitrate in a *porcelain* crucible, for six hours, in a current of oxygen. When the brown mass is heated strongly, in a *platinum* crucible, it gives off oxygen.

*Oxychloride of Didymium* ( $2\text{DiO} + \text{DiCl}$ ) is formed like the corresponding lanthanum compound, and is a gray powder.

*Sulphate of Didymium* ( $\text{DiOSO}_3 + 3\text{HO}$ ) forms handsome crystals. The water of crystallization corresponds to the quantity stated by Zschiesche, and conflicts with the quantity formerly given,  $8\text{HO}$ . Over sulphuric acid the salt loses a portion of its water of crystallization; at  $200^\circ \text{C.}$  ( $= 392^\circ \text{F.}$ ) it loses two equivalents; at  $250^\circ \text{C.}$  ( $= 482^\circ \text{F.}$ ) the remaining equivalent is driven off.

*Nitrate of Didymium* ( $\text{DiO},\text{NO}_3$ ) melts without decomposition at  $300^\circ \text{C.}$  ( $= 572^\circ \text{F.}$ ), and forms then a rose-red saline mass. *Zeitsch. Anal. Ch.*, No. 3, 1874, p. 317.

*Didymium*.—Cleve has prepared, examined, and describes the sesquioxide, chloride, bromide, chloro-platinate, chloro-aurate, bromo-aurate, fluoride, and platino-cyanide of didymium; the ferrocyanide of didymium and potassium; the sulphocyanide, nitrate, perchlorate, iodate, periodate, formiate, acetate, seleniate, potassio-sulphate, potassio seleniate, ammonio-sulphate, ammonio-seleniate, sodio-sulphate, sodio-seleniate, sulphite, selenite, hyposulphate, carbonate, potassio-carbonate, ammonio-carbonate, sodio-carbonate, oxalate, potassio-oxalate, tartrate, and pyrophosphate of didymium, in *Bull. de la Soc. Chim. de Paris*, March 20th, 1874; *Ch. News*, July 10th, 1874, p. 26.

#### MANGANESEIUM.

*Permanganate of Potassium*.—Rammelsberg has made some comprehensive experiments upon the behavior of permanganate of potassium when exposed to certain conditions. When carefully heated to redness it gives off 15.2 per cent. of oxygen, and the brown-black residue, 84.8 per cent., is a definite compound of superoxide of manganese, which, when brought in contact with water splits into free potassa and an acid compound; the superoxide of manganese being regarded by the

author as corresponding to an acid of composition  $\text{H}_2\text{Mn}_2\text{O}_8$  ( $\text{O} = 16$ ). The observation of Mitscherlich, that very dilute solutions of permanganate of potassium becomes green on the addition of solution of potassa, and which had been found correct by Aschoff, who observed that the change of color is due to the presence of organic impurity in the caustic alkali; Mohr had failed to obtain this result, but Rammelsberg finds Aschoff's observations to be correct. The reaction is, however, distinct from that observed when a concentrated solution of permanganate is boiled with caustic potassa for some time, in which event the solution also assumes an intense green color, but evolves oxygen abundantly. The author has, furthermore, observed a new

*Superoxhydrate of Manganese*, which, possibly, has formerly been observed by Berthier and by Dingler. The hydrate, obtained by the addition of sulphuric acid to permanganate of potassium, has, according to Mitscherlich, the composition of  $\text{MnO}_2 + \text{H}_2\text{O}$  ( $\text{O} = 16$ ). By gradually adding water to a mixture of permanganate and sulphuric acid, the author obtains a black hydrate, corresponding in its composition to the formula  $3\text{MnO}_2 + 2\text{H}_2\text{O}$  ( $\text{O} = 16$ ). Ph. Centralhalle, 1875, No. 19, p. 155; Ch. Centralbl.

*Permanganate of Potassium*.—It has been maintained by Phipson and Terreil that manganese only forms one acid, manganic, and that permanganate of potassium, commonly so called, is merely a bimanganate. The experiments of E. J. Maumeué furnish evidence that the ordinary view is correct. Ch. News, September 4th, 1874, p. 121; Comp. Rend., July 20th, 1874.

The danger of dispensing this salt with alcohol is again drawn attention to by Wn. (Wittstein?). A prescription composed of 10.0 cryst. permang. potass., and 15.0 each of alcohol and distilled water had been put up and the bottle well corked and tied over. Explosion of the bottle and injury to the operator resulted. Several experiments subsequently made resulted in explosion when the vial was corked. Arch. Pharm., February, 1875, p. 150.

*Manganate of Barium.*—Fleischer has recently given some valuable hints on the production of a very handsome green manganate of barium, which in many cases may be used as a substitute for the poisonous, so-called, Schweinfurth green (arsenite of copper). Böttger recommends the following method as yielding a handsome product: Into a melting mixture of 2 parts potassa and 1 part chlorate of potassium, 2 parts finely powdered peroxide of manganese is gradually introduced, and the mass is finally heated to moderate redness. It is allowed to cool, powdered finely, extracted with cold water, and the magnificent green filtrate is precipitated, in the cold, with nitrate of barium. The so precipitated neutral manganate of barium, which has a handsome violet color, is thoroughly washed with water, is dried, mixed with  $\frac{1}{2}$  to 1 part of hydrate of baryta, and heated in a copper vessel to faint redness, until the cooled mass has a pure green color. This is then finely powdered and washed with cold water to remove any excess of baryta. Zeitschr. Oest. Apoth. Ver., June 20th, 1875, p. 297.

#### IRON.

*Determining Iron.*—A simple method, originally devised as a rough and ready method, yielded to W. Noel Hartley such remarkably accurate results, that he recommends it to students beginning quantitative analysis. Equal weights of the ore to be examined and of fine iron wire (about four or five grams) are dissolved, and made up to the same volume. A pipetteful of each solution is then taken, and the ferric salt reduced to the ferrous state by warming with granulated zinc. Permanganate is used for the titration, the comparative amounts required for the pure iron and for the ore giving the percentage of iron in the latter. Ch. News, March 12th, 1875, p. 113; Proceed. Ch. Society, March 4th, 1875.

*Iron by Hydrogen.*—P. Carles concludes from his experiments that commercial iron by hydrogen is not carefully prepared, and suggests that it be replaced by other ferruginous preparations, which the pharmacist may readily obtain in a state of purity, which can be assayed with exactness,



and whose absorption is quite certain. Of nine samples examined by him, only one sample approached purity, containing 99 per cent. of metallic iron, and traces only of oxide, sulphur, and sugar. The sample in question had been mechanically reduced to powder, and then inclosed in gelatin capsules to prevent oxidation; but while the capsules professedly contained 0.1 gram of iron, they really contained much less, the quantities varying between 0.040 and 0.065 grams. The other samples contained, besides varying quantities of carbon, silica or sand, and sulphur, metallic iron to the amount of 32 to 75 per cent., and oxide of iron from 24 to 46 per cent. Some samples contained phosphorus. The author estimated metallic iron in conducting his experiments by operating upon 0.1 gram, mixed with 5 grams of hot water in a flat-bottomed dish, with a solution prepared with 4.53 grams of iodine, 5 grams of iodide of potassium, and 100 c.c. of water; 1 c.c. of this solution combines with 0.01 gram of iron. If the iron is greasy, has been considerably heated, or is superficially oxidized, the application of heat to the mixtures may have to be repeated. That all the iron has combined with the iodine is evidenced by the residue which remains not evolving hydrogen with muriatic acid. A separate portion of the iron is treated with muriatic acid, and the resulting gas passed through sugar of lead solution, in order to estimate sulphur as sulphide of lead. The undissolved residue contains sand, carbon, etc. A. J. Ph., December, 1874, p. 560; from Jour. de Ph. et de Chim., September, 1874.

*Reduced Iron* is best obtained chemically pure, according to Crolas, by the process of Dumas and Boussingault. The protochloride of iron is deprived of sulphates by chloride of barium, crystallized to separate chloride of barium that may be in excess, dissolved in distilled water, and precipitated by ammonia. The washing is necessary, the chloride of ammonium formed being removed by a red heat. Perfectly dry hydrogen is passed through, and the resulting product is chemically pure, never giving off sulphuretted hydrogen while in the stomach. Ch. and Drug., July 15th, 1874.

The quality of iron by hydrogen of commerce has been the

subject of elaborate investigation by J. Creuse, and the author's paper will be consulted with interest and profit. See Proceedings, 1874, pp. 435 to 448.

*Sesquisulphide of Iron*, of a beautiful dark emerald-green color, is produced, according to Dr. T. L. Phipson, when ferric chloride is added to a solution of sulphide of ammonium containing a certain quantity of hypochlorite of sodium, or whenever a persalt of iron, containing free chlorine or a hypochlorite, is precipitated by sulphide of ammonium. The latter must in both cases have acquired, by age, the ordinary yellow tint. The sesquisulphide of iron appears quite black when collected on the filter and washed, but when dried and ground up with a perfectly white powder, such as chalk, its fine green color appears. It is soluble to a notable extent in water containing ammonia, but separates from the emerald-green solution formed as the ammonia escapes. It is even soluble in alcoholic ammonia, but is only slightly soluble in a mixture of sulphide of ammonium and hypochlorite solution, either dilute or concentrated. Its composition answers very nearly to the formula  $2\text{Fe}_2\text{S}_3, 3\text{HO}$ , and it is, consequently, a hydrate. Chem. News, September 18th, 1874, p. 139.

*Ferrous and Ferric Iodides*.—Max Tschirner has repeated some of the experiments of F. F. Meyer upon syrup of ferrous iodide (see A. J. Ph., 1860, p. 171), and has obtained results which differ from those of Mayer very materially. Mayer believed to have observed that when solutions of ferrous iodide are made by the reaction of iodine, iron, and water, such solution did not contain the quantity of iron that should have been present for the quantity of iodine employed. Tschirner finds this difference to be due to impurities in the iodine, and that when allowance is made for these, the amount of iron in the liquid is equivalent to the iodine employed. Mayer had attributed the acid reaction of solutions of ferrous iodide to presence of free HI. This also is an error, such acid reaction being characteristic of the iron groups.

The author furthermore remarks that the existence of ferric iodide is very doubtful. Ferrous iodide dissolves free iodine,

but the solution only gives the reactions of a ferrous salt and free iodine. Freshly-precipitated ferric oxide dissolved in HI yields by heating only iodine and ferrous iodide. The aqueous solution evaporated in a glass retort on a water-bath to syrupy consistence gives, on cooling, a greenish-black, solid ferrous iodide, which, dissolved again, contains free iodine.

Inasmuch as most of the dry ferrous iodide of commerce is decomposed, the author recommends every apothecary to prepare it himself at a minute's notice, by pulverizing iodine with the aid of a few drops of alcohol, and adding pulverized iron in slight excess; the chemical heat evaporates the few drops of alcohol, and leaves a hard, black, ferrous iodide. A. J. Ph., June, 1875, pp. 249-252.

The editor of the A. J. Ph., in a footnote, quotes Mohr's and Nicklés' experiments (made respectively in 1858 and 1865), according to which ferric iodide seems to exist. Ibid., p. 251.

*Old (Sub-) Carbonate of Iron.*—By heating some subcarbonate of iron, which had completely changed color, having a color resembling that of yellow ochre, Mr. M. S. Bidwell succeeded in restoring it to its original deep red-brown color. During the heating aqueous, and probably also ammoniacal vapor was given off, and it was found to have lost about 10 per cent. The heating was conducted over a stove in a cast-iron spider. The subcarbonate had been in the store a long time, was of the kind formerly prepared in drops, and was a good article, being completely dissolved by muriatic acid previous to, as well as after, heating it in the manner indicated. The Pharmacist, November, 1874, p. 323.

#### COBALT.

*Bromide of Cobalt* is prepared by W. N. Hartley by allowing bromine, with a little water, to act upon metallic cobalt for a week or so. A purple solution is formed, which on concentration becomes blue, and if then allowed to stand over sulphuric acid, it deposits crystals having the composition of  $\text{CoBr}_2 \cdot 6\text{H}_2\text{O}$  ( $\text{O} = 16$ ). The salt fuses when heated to  $100^\circ \text{C}$ .

(= 212° F.), loses water, and on cooling a mass of purplish-blue crystals, of the formula  $\text{CoBr}_2 \cdot 2\text{H}_2\text{O}$  ( $\text{O} = 16$ ), are obtained. At 130° C. (= 286° F.) it becomes an amorphous brilliant green-colored mass, which is the anhydrous bromide  $\text{CoBr}_2$  ( $\text{O} = 16$ ).

*Iodide of Cobalt* is prepared in a similar manner to the bromide, and on evaporating the solution, and allowing it to stand, a compact mass of green crystals, having the composition  $\text{CoI}_2 \cdot 2\text{H}_2\text{O}$  ( $\text{O} = 16$ ), is formed. This salt is even more deliquescent than chloride of calcium. When dried at 100° C. (= 212° F.) it loses weight, a portion of the iodine being replaced by oxygen. On evaporating a solution of the iodide until the solution becomes green, and cooling to 16° C. (= 60.8° F.), it assumes a brown color, and on standing deposits large hexagonal crystals, of the color of smoky quartz, having the formula  $\text{CoI}_2 \cdot 6\text{H}_2\text{O}$  ( $\text{O} = 16$ ). Ch. News, April 10th, 1874, p. 161.

#### NICKEL.

*Nickel*.—Until within a few years most of the nickel of the world came from Germany, but the discovery of mines in America has entirely driven the foreign article from our markets, and considerable quantities are now exported to Europe. But one mine, situated in the beautiful Pequea Valley, in Lancaster County, Pennsylvania, is believed to be the largest in the world. The valley is particularly rich in minerals; for, besides the copper found in connection with the nickel, there are large deposits of iron and limestone a short distance south. Am. Dr. Circ., January, 1875, p. 39.

*Sulphate of Nickel*.—A. Terreil recommends its preparation from commercial nickel, which is an alloy of nickel, copper, and iron, with traces of arsenic, containing 40 to 90 per cent. of actual nickel, by a process, by which the use of sulphuretted hydrogen or of ammonia is avoided. The alloy is dissolved in 7 or 8 parts of aqua regia; evaporated near to dryness; redissolved in water, using about five times the weight of alloy originally employed; the solution filtered to remove the small quantity of arseniate of iron formed; the hot solu-

tion is digested with metallic iron, preferably small nails, until a bright piece of iron, introduced in the solution, is no longer tarnished by copper, when the whole is thrown upon a filter, and the residue washed. The filtrate now only contains nickel and iron, and perhaps traces of arsenic. The iron is now peroxidized, either by chlorine or by nitric acid, sulphuric acid of 66° B. is added in proportion of 2 parts for 1 part of alloy employed, and the mixture is evaporated to dryness to expel nitric and hydrochloric acids. The dry residue is redissolved, a portion of subsulphate of iron sometimes remaining insoluble, and the iron is then treated with precipitated carbonate of barium as long as effervescence is produced, whereby the iron and the last traces of arsenic are removed, and pure sulphate of nickel remains in solution; the latter not being affected by the carbonate of barium. The solution is filtered, evaporated to a pellicle, and crystallized. *Ch. News*, March 25th, 1875, p. 141; *Bull. Soc. Chim. de Paris*, January 5th, 1875.

#### URANIUM.

*Uranium*.—The residues from phosphoric acid determinations are best utilized, according to E. Reichardt, by taking advantage of the ready formation of ammonio-phosphate of magnesium. The residues are dissolved in concentrated muriatic acid by the aid of heat; a little iron present is oxidized by means of nitric acid, and the liquid after dilution is filtered and treated with soda until the precipitate first formed is redissolved, and a little oxide of iron only floats in the otherwise clear liquid. This is filtered out, and the clear liquid is treated with chloride of magnesium, chloride of ammonium, and ammonia in excess, as in phosphoric acid determinations. The ammonio-phosphate of magnesium is allowed to separate during twelve to twenty-four hours; the clear liquid is tested for the absence of phosphoric acid, if necessary; is then acidified with hydrochloric acid, and, after heating, to drive off carbonic acid, the oxide of uranium is precipitated by a slight excess of ammonia. The hydrated oxide of uranium so obtained is washed, dissolved in acetic acid, and ready for future use. *Zeitschr. Anal. Ch.*, No. 3, 1874, p. 310.

*Pentachloride of Uranium*,  $\text{UCl}_5$  ( $\text{O} = 16$ ) is formed, according to H. E. Roscoe, when dry chlorine is passed over a moderately heated mixture of carbon and one of the oxides or oxychlorides of uranium. It exists in two modifications. When the chlorine is admitted very slowly, long, needle-shaped, dark crystals are obtained, which by reflected light are metallic-green, and by transmitted light of a magnificent ruby-red color. When the chlorine is allowed to flow in rapidly, a brown, mobile powder is formed. It is an exceedingly hygroscopic compound, deliquescing on exposure to air in a few minutes and forming a yellowish-green liquid. It dissolves in water with a hissing noise, and evolution of hydrochloric acid vapors. Ch. Centralbl., No. 42, 1874, p. 657.

#### CHROMIUM.

*Chromium Salts*.—A. Etard has studied some of the reactions of chromium salts. At present the reactions are not known by which the salts of sesquioxide of chromium can be converted instantly, and at will, from one modification to the other. The green salts only become violet under the influence of nitric acid after the expiration of a longer or shorter time. Certain reagents, the author finds, produce an immediate effect. The green salts become violet if mixed in the cold with a little nitrite of potassium. The carmine tint developed at the moment of the mixture of the two solutions, and which resembles that of the amido-chromic compounds, gradually disappears to give place to the blue violet, which has chrome alum for its type. Sulphocyanide of potassium produces the same phenomena, but more slowly. The green solutions of chrome, if precipitated by potassa, give a hydrate insoluble in ammonia, and which, if redissolved in acetic acid somewhat concentrated, takes a carmine-violet color. In this case the carmine tint does not pass into the violet-blue in the course of time. Under the influence of arseniates, or of free arsenic acid, the violet salts become bright green in a few seconds in the cold, and cannot be brought back to a violet by the nitrites. Nitrate of silver does not precipitate the arsenic acid of these salts. Loewel admits four modifications

of hydrate of chrome, two green, one violet-carmine, and one violet-blue. The violet-carmine salt obtained with a nitrite gives with potash a gray precipitate insoluble in ammonia, which distinguishes this salt from the ordinary violet-blue salt. The light-green salt obtained with arseniates has the equally characteristic property of giving with potash a precipitate insoluble in acetic acid, and soluble in ammonia with a violet-blue color; a reaction exactly opposite to the ordinary deep-green salts. Ch. News, June 18th, 1875, p. 269; Compt. Rend., May 24th, 1875.

*Chrome Alum.*—Lecoq de Boisbaudran has observed that blue solutions of chrome alum, recently prepared in the cold, acquire gradually a greener shade, and that green solutions of the same alum, recently prepared in heat, gain by degrees a more blue tint; in a word, the two solutions approach slowly to an intermediate color, which is the proof of the coexistence of the two modifications, in a stable and constant state of equilibrium, for one and the same temperature. These changes are observed whether the liquids are in closed or open vessels, with or without contact of crystals, and whether concentrated or dilute. To determine the exact nature of the change, the author takes advantage of the change of volume which should accompany the change of molecular equilibrium of the salt, and finds, by his experience, that on the one hand the blue alum loses a part of its water of hydration in becoming green, and on the other the green alum of the solution gains water in becoming blue. Ch. News, Jan. 22d, 1875, p. 40; Compt. Rend., Dec. 22d, 1874.

Dr. Gernez, by his experiments, shows that solutions of chrome alum, which by heating to  $100^{\circ}\text{C.}$  ( $= 212^{\circ}\text{F.}$ ) have been converted into the green modifications, are uncrystallizable, even when they are supersaturated, if they are absolutely free from traces of violet chrome alum or any other alum. They retain the green color, and leave, upon slow evaporation, a green, transparent mass, which gradually becomes fissured. But if a fragment of crystallized chrome or other alum is introduced into the green solution, crystalliza-



tion begins at once, and violet chrome alum crystallizes out. Ph. Centralhalle, No. 22, 1875, p. 184.

*Chromic acid* and *glycerin* seem to form an explosive mixture. A pharmacist in Vienna received recently the following prescription:

R. Acidi chromici, . . . . . 8 grams.  
 Glycerini, . . . . . 1 drachm.  
 M. d. s. for external use.

The chromic acid was shaken in the vial with a little water, the glycerin added, and the vial again shaken, when explosion, accompanied by violent detonation, resulted. The contents of the vial were ejected completely, but, strange to say, the vial remained intact, and was coated internally with a black mass. Zeitschr. Oest. Apoth. Ver., June 1st, 1875, p. 260.

#### ZINCUM.

*Calamine*.—Dr. Tilbury Fox, who prescribes calamine powder largely in his practice in the form of a lotion, objects to the use of certain grades so frequently found in the market, as also to an artificial substitute. According to his view the following should be the properties of calamine powder:

1. Its color should be very pale salmon, or pale flesh-colored.
2. It should not be coarse, nor gritty, nor sandy feeling in *the least degree* when rubbed between the fingers.

3. It should be such a powder as will not leave behind in the mortar, on making up a lotion with it, any gritty particles.

It can be prepared from the rougher or common calamine powder by repeated incinerations, levigations, and subsidences. It may take a long time to prepare, but the author knows it can be made. Ph. Jour. Trans., Nov. 14th, 1874, p. 381.

#### CADMIUM.

*Cadmium*.—The crystallization of metallic cadmium, by distillation with hydrogen, is so simple a matter that H. Kaemmerer recommends it for a lecture experiment. About 5 or 10 grains of metallic cadmium are heated in a hard, glass



tube, about 40 centimetres long, drawn out at one end to a point, and through which is passing a rapid current of hydrogen. The cadmium vaporizes and condenses, in the cold portion of the tube, to numerous large and small drops, each one of which, on cooling, forms an isolated crystal. Jour. Appld. Ch., April, 1875, p. 57.

#### COPPER.

*Subchloride of Copper.*—K. Heumann proposes the following convenient method for preparing subchloride of copper. A mixture of 14.2 parts of powdered oxide of copper and 7 parts of ordinary powdered zinc is added in small portions, and with continual stirring, to common concentrated hydrochloric acid, contained in a beaker; whereby energetic reaction occurs, and frothing over may result if sufficient care is not observed. As soon as a white precipitate of subchloride of copper appears more hydrochloric acid is added, followed by fresh portions of the mixture as before, and this alternate addition of acid and mixture is continued until the latter is used up. If, finally, a white precipitate has formed, this is dissolved by sufficient acid, the mixture is allowed to stand, and then decanted clear, from a slight precipitate of metallic copper, into a flask, which is then filled to the neck with well-boiled water, corked, and allowed to stand. In a short time snow-white subchloride of copper is deposited, which is collected on a filter, washed with water, and dried in the dark. Ph. Centralhalle, No. 33, 1874, p. 267.

*Cuprous chloride* is prepared by Sydney Lupton as follows: A flask containing copper turnings, and common hydrochloric acid, is heated to between  $70^{\circ}$  and  $80^{\circ}$  C. ( $=158^{\circ}$  and  $176^{\circ}$  F.), a crystal of chlorate of potassium being thrown in from time to time. When the copper is nearly dissolved the deep-brown solution is poured into water. Cuprous chloride falls as a dazzling white crystalline powder, which is washed once or twice, by decantation, to remove chloride of potassium and free acid. The precipitate may then be dried with the usual precautions. Cuprous chloride prepared in presence of free

acid does not decompose, when kept under water, into the oxide, as does that prepared of cupric chloride, but very slowly forms traces of cupric chloride in solution. Ch. News, Nov. 20th, 1874, p. 233.

*Ammoniacal solution of oxide of copper* (Schweitzer's solvent for cellulose) is best prepared, according to Prof. Böttger, by filling a glass tube, about two feet long and one to two inches in diameter, and narrowed to a point at the lower end, with thin sheet-copper strips and, having closed the narrow end of the tube by means of rubber tubing and a clamp, filling it with strong solution of ammonia. The ammoniacal liquor is drawn off every few minutes, and poured on again for several hours, when it will be completely saturated and ready for use. N. Rep. Pharm., Nos. 11 and 12, 1874, p. 732.

#### TIN.

*Tin.*—A certain quantity of tin, in the ordinary form of blocks, was forwarded by rail, from Rotterdam to Moscow, during the winter (1873–1874), and arrived at its destination in the form of a coarse powder. A sample of the metal, examined by Oudemans, was found to resemble sulphide of molybdenum, and proved to be nearly pure, containing but 0.3 per cent. of lead and iron. Nevertheless, attempts to reunite the metal by fusion failed, and gave rise to so large a quantity of stannic oxide that the whole mass appeared as a gray powder. The author thinks that the molecular modification produced in this case was due to vibration and exposure to a low temperature. Chem. News, July 24th, 1874; from Les Mondes.

#### TUNGSTEN.

*New Reactions of Tungsten.*—Prof. Mallet finds that, contrary to the statements in most manuals, the precipitate produced by hydrochloric acid in the solution of an alkaline tungstate is to a great extent soluble in excess of the concentrated acid, and if zinc in fragments be gradually added to this solution various colors will be produced, notably a magenta

red, whilst a rich green is obtained if sulphocyanide of potassium is added before the introduction of the zinc. If a mixture of an alkaline tungstate with a sulphocyanide in dilute solution is acidified with hydrochloric acid, and metallic zinc is added, the liquid assumes a fine amethyst color. The blue color, well known as characteristic of one of the lower oxides of tungsten, may be most conveniently developed by the use of hyposulphurous acid as the reducing agent. Ch. News, June 25th, 1875, p. 276.

#### MOLYBDANIUM.

*Molybdic Acid* forms, according to H. Debray, with arsenic acid compounds as complex and as well defined as the phospho-molybdates. H. Rose has pointed out that arsenic acid forms with molybdates of ammonium in a nitric solution a yellow precipitate like that given by phosphoric acid under the same circumstances. This substance, like its analogue, is the ammoniacal salt of a compound yellow acid, resulting from the combination of 1 equivalent of arsenic acid with 20 equivalents of molybdic acid. Its composition may be represented by  $3\text{NH}_4\text{O}, \text{AsO}_5, 20\text{MoO}_3$ . Chem. News, July 10th, 1874; from Comp. Rend., May 18th, 1874.

*Molybdate of Sodium* is, according to F. Jean, decomposed by prolonged ebullition with sal ammoniac; and *tungstate of sodium* is decomposed in an identical manner. The chlorine of the sal ammoniac saturates the base of the metallic salt, the acid of which combines immediately with the liberated ammonia to form an alkaline salt, which, on boiling, becomes an acid salt and loses ammonia. It is remarkable to find a decidedly acid liquor which evolves ammonia. Ibid.

#### BISMUTH.

*Bismuth in Mexico.*—According to G. von Uslar, bismuth is found in considerable quantities in the neighborhood of San Luis Potosi, in the form of a mineral which has been recognized by Florencis Cabrera as bismuth-ochre. Several mines have been opened for its extraction. It is found also in the

states of Guanajuato and Aguas Calientes. Ph. Centralhalle, No. 24th, 1875, p. 198; Polyt. Centralbl.

*Bismuth.*—According to R. Böttger, bismuth possesses the property of increasing in volume, when from its melted condition it passes to its solid form; expanding at the moment of solidification with great violence. It is also capable of imparting this property to various alloys, *i. e.*, Rose's metal (2 p. Bi, 1 p. Pb, and 1 p. Sn). If a portion of thin flowing melted bismuth or Rose metal is drawn up into a capillary tube of glass, and the tube is then laid horizontally on a table, or held in the air, the tube often bursts not unfrequently with a strong report, the fracture being parallel to the length of the tube. Ph. Centralhalle, July 16th, 1874, p. 238.

*Bromide of Bismuth*, obtained by heating finely powdered bismuth with dry bromine in a glass tube closed at the end, is described by Macivor as follows: Solid, dark gray, fusible at  $198^{\circ}$  to  $202^{\circ}$  C. ( $- 388.4^{\circ}$  to  $395.5^{\circ}$  F.) to a dark-red liquid which boils below a dull red-heat, insoluble in bisulphide carbon, alcohol, or ether; soluble in hydrochloric acid; decomposed by nitric acid; by water into amorphous oxybromide and free hydrobromic acid; absorbs moisture from the atmosphere, and becomes of sulphur-yellow color. Ch. News, October 23d, 1874, p. 191.

*Bismuth. Subnitricum.*—E. Heintz recommends the following method of its preparation, which secures a preparation free from arsenic and corresponding to the commercial (German) article: 2 parts of bismuth are dissolved in 9 parts of nitric acid, the solution is filtered through gun-cotton, diluted with sufficient distilled water to induce decided turbidity, and again filtered. Sufficient ammonia solution, diluted with an equal part of water, is then added to nearly, but not quite, neutralize the liquid; it is allowed to stand an hour and is then rapidly filtered, washed by three successive additions of water, and dried at a gentle heat. Arch. Ph.. August, 1874, p. 141.

When subnitrate of bismuth is prepared strictly according to the German Pharmacopœia, a considerable quantity of bismuth remains in the acid mother liquors. Shorting states,

that when the acid liquor is allowed to remain in contact with strips of iron for several weeks (4-6), the bismuth is completely precipitated in the form of a metallic powder, and may then be used in the next operation. The iron bands used for baling cotton serve an excellent purpose. Arch. Ph., October, 1874, p. 328.

(The process of the German Pharmacopœia consists in precipitating the concentrated acid solution in a large volume of water.)

#### ARSENICUM.

*Arsenic.*—G. Christel, having occasion to examine some anilin-colored glazed paper, which subsequently proved to contain arsenic, devised and recommends the following rapid method for determining the presence of the poisonous metal in paper or woven fabrics: A portion of the paper or fabric is placed in a test-tube, covered with dilute muriatic acid, and heated until the coloring appears dissolved. The liquid, which is generally clear, is decanted, a few pieces of bright copperfoil are immersed in it and heated. In the presence of arsenic, the surface of the copperfoil becomes covered with a gray-black film of arsenide of copper,  $\text{Cu}_3\text{As}$ . The copperfoil is then removed, mixed with a little distilled water, carefully dried with blotting-paper, and finally heated gently to remove the last traces of moisture. The foil is then introduced into a dry and previously warmed test-tube, which is then heated over a spirit-lamp at the point of contact with the surface of the foil. The arsenic sublimes on the upper, cool part of the tube, and its crystalline structure of the ring formed may be readily observed by means of a lens. The ring is moistened with a few drops of muriatic acid, and a few bubbles of sulphuretted hydrogen are allowed to enter the tube, when it will assume the characteristic yellow color of sulphide of arsenic. The operation requires hardly a quarter of an hour, and a mistake of identity is not possible. Arch. Ph., August, 1874, p. 131.

*Arsenic.*—The following qualitative method for the detection of arsenic in organic and inorganic matter is recom-

mended by Mayencon and Bergeret: Pure zinc is placed in a small flask containing distilled water acidulated with sulphuric acid; the substance to be tested for arsenic is then introduced, and the neck is loosely stopped with cotton, to prevent drops of the liquid being thrown on the test-paper, which is simple tissue-paper moistened with a solution of bichloride of mercury, and used before it dries. Pure hydrogen has no effect upon such paper, but arsenuretted hydrogen produces a lemon-yellow spot. If antimony instead of arsenic is present, a brown spot, quite distinct from that produced by arsenic, appears. The reaction is quite delicate. Ch. News, August 28th, 1874, p. 104.

*Arsenic Acid.*—In order to determine the quantity of arsenic in the arseniate of magnesium and ammonium precipitate, obtained by well-known methods, G. C. Wittstein recommends that the precipitate be first dried at a gentle heat, then transferred to a porcelain crucible, heating on a sand-bath until ammonia is no longer evidenced by the smell, and then to heat gradually on an open fire until near redness. The residue is composed of  $2\text{MgO} + \text{AsO}_5$ , and furnishes a very accurate basis for calculation. Rammelsberg had recommended a similar method (in No. 7, 1874, *Berichte der deutschen chem. Gesellschaft*), but Wittstein claims priority, having published the same in 1858. *Zeitschr. Oest. Apoth. Ver.*, No. 1, 1875, p. 2.

*Iodo-arsenic Acid*, which Prof. Zinno had obtained by a certain process (see *Proceedings*, 1874, p. 204), cannot be obtained by that process, according to the experiments of Wegner. When iodine is dissolved in a solution of arsenious acid, as long as decoloration takes place, the liquid contains hydriodic and arsenic acids, the presence of which can be readily proven by the reaction with nitrate of silver. On evaporation, iodine is set free, and the arsenic acid is reduced to arsenious acid, which finally crystallizes in octahedrons and flat tables; these are arsenious acid, retaining a small quantity of hydriodic acid. Precisely the same behavior is shown by a mixture of solutions of hydriodic and arsenic acids. A. J. Ph., February, 1875, p. 66; from *Anal. d. Chemie*, 1874.

*Arsenic Fluoride*.—R. W. Emerson Macivor obtains arsenic fluoride by the action of sulphuric acid on an intimate mixture of dry fluoride of calcium and anhydrous arsenic trioxide, contained in a small leaden retort. It distils over at a low temperature, and may be collected in a dry glass receiver. It is a colorless, very volatile liquid; emits dense vapors on exposure to air; boils at  $64^{\circ}$  to  $66^{\circ}$  C. ( $= 147.2^{\circ}$  to  $150.8^{\circ}$  F.); has a specific gravity of 2.66; is miscible with alcohol and ether, but is decomposed by water, with production of arsenic trioxide and hydrofluoric acid. Hence, while it may be kept in glass vessels in its anhydrous condition, it corrodes these in the presence of a small quantity of water. Submitted to the action of dry ammoniacal gas, it forms a white, non-crystalline mass, which dissolves unchanged in alcohol and ether, but is decomposed by water, forming fluoride and arsenite of ammonium. Ch. News, October 9th, 1874, p. 169.

#### ANTIMONIUM.

*Antimonial Preparations—Determination of Arsenic in them*.—Mr. Thomas Williams applies a method for the detection of arsenic in the antimonial preparations of pharmacy, which is dependent on the circumstance, that when an alloy of antimony and potassium is subjected to the influence of water, the potassium is oxidized and hydrogen *alone* is eliminated, whereas when a similar alloy of arsenic is so treated, the hydrogen unites with a portion of the arsenic, and is eliminated as arsenuretted hydrogen. To prepare the alloy, if from *tartar emetic*, an ounce of the preparation is introduced into a clay crucible, covered, and exposed to a bright red heat for forty minutes, after which the crucible is allowed to cool, is broken, and the bottom carefully cleaned from slag. If any other antimonial preparation is to be tested, *sulphide*, *oxide*, etc., a half ounce is mixed with a half ounce of cream of tartar, and the alloy prepared as with tartar emetic. The amount of hydrogen that is eliminated by the reaction of water upon the alloy is so small, that it cannot be tested direct for arsenic without danger of explosion. It is therefore necessary to supplement a portion of hydrogen. To conduct the test the author

has therefore contrived the apparatus shown in Fig. 47. A represents a hydrogen generator; B, a U-tube, containing fragments of pumice-stone, moistened with strong sulphuric acid; C is the bottle which contains the alloy; D, the jet-tube; E, a glazed porcelain dish, against which the flame is depressed, which should contain cold water, to prevent the volatilization of the mirror by prolonged contact with the flame. The alloy, immediately after its removal from the crucible, is

FIG. 47.

broken up and introduced into the bottle C. Hydrogen is then generated, by means of zinc and sulphuric acid, in the bottle A, and after it has passed through the apparatus for a short time, and all the air is displaced, is tested to establish its purity from arsenic. Half an ounce of water is then introduced into the bottle, C, through the double-bulbed funnel-tube, F, when an arsenical mirror will be produced, if arsenic is present in the original sample. For the success of the experiment it is necessary that the bottle C is of the smallest possible capacity, and with its funnel absolutely dry when the alloy is placed in it. To prevent the escape of gas through the funnel-tube, as little mercury as will plug the bend is poured down the funnel.

Another method is founded on the fact, that recently precipitated arsenious sulphide is soluble in bisulphite of potas-



sium, while sulphide of antimony is not. A gram of the substance, mixed with its weight of sulphur, is digested in a tolerably strong solution of protosulphide of potassium, filtered, the filtrate diluted, a strong solution of sulphurous acid added in excess, and boiled for a length of time. The sulphide of antimony is then filtered off, and sulphuretted hydrogen passed through the filtrate, will produce a yellow precipitate of arsenious sulphide, if arsenic is present in the substance.

A third method, applied to tartar emetic, is as follows: Two grams of tartar emetic is dissolved in 4 grams of chemically pure hydrochloric acid, sp. gr. 1.124, in a test-tube; 30 grams of hydrochloric acid, saturated with sulphuretted hydrogen, is then added; the solution, after standing some time, will yield a yellow precipitate of arsenic sulphide, if arsenic is present in the substance. Ph. Jour. Trans., July 25th, 1874, p. 63.

*Artificial Crystals of Antimony* were formed accidentally, according to Laspeyres, in a mass of slack, formed during the preparation of hard lead (Hartblei). They were, when first obtained, exceedingly lustrous, and of the color of tin, and contained but traces of lead, sulphur, iron, and manganese. Arch. Ph., Oct. 1874, p. 360.

*Tribromide of Antimony* is, according to R. W. Emerson Macivor, most readily procured by the gradual addition of powdered metallic antimony to dry bromine, contained in a tubulated glass retort until light is no longer emitted, and then submitting the product to distillation. On cooling the tribromide forms a colorless solid, crystallizing in needles, and fusing at  $90^{\circ}\text{C.}$  ( $= 194^{\circ}\text{F.}$ ) to a greenish-yellow colored liquid. It is soluble in alcohol, ether, hydrochloric and hydrobromic acids, and in bisulphide of carbon; absorbs moisture with great avidity, and is decomposed by water, the product of the decomposition being free hydrobromic acid and an oxybromide, the composition of which varies with the temperature at which its precipitation is effected. Ch. News, April 24th, 1874, p. 179.

*Triiodide of Antimony* is obtained, according to Macivor,

when an intimate mixture of finely powdered metallic antimony and dry iodine is heated in a porcelain basin, over which an inverted funnel is placed. Orange-colored vapors rise and condense within the funnel in the form of very fine, transparent, scarlet-colored scales, which constitutes the substance under consideration. Triiodide of antimony is soluble in alcohol and in bisulphide of carbon, but is insoluble in benzole. By water it is decomposed, hot water precipitating the oxyiodide of a lemon-yellow color. Ch. News, June 12th, 1874, p. 255.

*Kermes Mineral.*—Terreil finds that the preparation of kermes mineral in the moist way can only be effected by means of carbonate of sodium, while, when preparing it in the dry way, carbonate of potassium is the most suitable. The latter has no action upon the sulphide of antimony in the moist way, and this character he thinks may serve as a test for showing the presence of soda in carbonate of potassium. Hydrate of calcium attacks sulphide of antimony in the moist way, while the hydrates of barium and strontium are without action upon it. Ch. News, 1874, p. 72; from Compt. Rend.

#### HYDRARGYRUM.

*Purification of Mercury.*—A. R. Leeds proposes the following method for the purification of mercury, which is illustrated by Fig. 48: *A* is a glass funnel, capable of holding 5-10 pounds of mercury, the neck of which passes through a cork into the bottle (*B*), is cut off close beneath this, and is stopped with cotton. A tube, bent at right angles, is passed through a second opening in the cork, and is connected with a water air-pump by means of a rubber tube. The flask (*B*) is two-thirds filled with dilute nitric acid (one part acid and four to five water). The mercury poured into the funnel (*A*), passes by numerous channels in the cotton into the acid in the form of a fine spray. The acid dissolves the foreign metals in the mercury, which accumulate at the bottom of the mercury, pass into the funnel (*C*), which is connected with the flask (*D*), and stopped with cotton pre-

cisely as is the first flask. The mercury passing through the cotton (by the aid of suction) into the second flask is dry and pure. *Zeitschr. Anal. Ch.*, No. 3, 1874, p. 312.

FIG. 48.

*Mercury.*—Its detection in urine, extracts, etc., is simplified, according to Mayençon and Bergeret, as follows: A nail, to which a piece of platinum wire is fastened, is immersed in the urine, etc., and pure sulphuric acid is added, until hydrogen is slowly evolved. Mercury, if present, is then deposited in the metallic state on the platinum wire, which, after a time, is removed from the liquid, washed, and exposed to the vapor of chlorine, in order to convert the mercury into bichloride. If the wire is then gently stroked over a piece of filtering-paper, which has been moistened with a 1 per cent. solution of iodide of potassium, the characteristic red color of biniodide of mercury is produced, and may be again removed by excess of iodide of potassium. *N. Rep. Ph.*, No. 6, p. 376.

*Mercury Compounds.*—J. Schnauss has made some interesting observations upon certain compounds of mercury, chiefly the chlorides, in their relation to salts of silver when exposed to light, to hyposulphite of sodium, etc. The author summarizes his results as follows:

1. A mixed precipitate of chloride of silver and of calomel is not affected by light.

2. The same is true of the precipitate resulting from an admixture of nitrate of silver and corrosive sublimate; but it becomes sensitive to light by an excess of nitrate of silver, or by the addition of ammonia.

3. The chloride of silver produced by the action of corrosive sublimate upon the nitrate always contains a quantity of an insoluble mercury compound (calomel).

4. Calomel, contrary to the general assumption, is not converted into sulphide of mercury by the action of hyposulphite of sodium, but into metallic mercury and a soluble compound, which

5. Composes the crystalline double salt of hyposulphite of prot- (sub-) oxide of mercury and sodium.

6. Among the haloid compounds of mercury—all of which are affected by light, though slowly—the prot- (sub-) iodide is distinguished for its extreme sensitiveness to the influence of light, and is, in this respect, allied to the haloid compounds of silver. *Arch. Ph.*, May, 1875, p. 411.

*Bichloride of Mercury.*—M. Buetot had received some pulverulent bichloride of mercury, which, when dissolved in water, formed a colorless solution, in which, however, small yellow particles were observed to float. Upon dissolving a portion in alcohol an intense red solution was formed. Suspecting the presence of anilin, he tested for that substance, and found it to contaminate the salt. The author considers the foreign matter causing the contamination was rather the residue of a manufacture than a commercial substance mixed by inadvertence, and that it is probable that the high price of mercury has brought into the market mercurial preparations that have been previously used in the manufacture of

anilin colors. Ph. Jour. Trans., 1874; from Jour. de Ph. et de Chim.

*Vermilion*.—L. Raab gives the following method of making vermilion, which gives excellent results without the necessity of attending to temperature and other particular manipulations as is necessary by the ordinary method: Finely powdered sublimed calomel is heated with a solution of hyposulphite of sodium to boiling, until its complete conversion into black sulphide results. The mixture is then allowed to cool, and the clear liquid decanted. To the residual black sulphide a solution of sulphide of potassium is then added, and the whole evaporated to dryness. During the drying the black sulphide is converted into the red modification. The vessel is allowed to cool, the dry mass washed thoroughly with warm water, and the vermilion remaining is dried. In this manner a product, approaching Chinese vermilion, is readily and conveniently obtained. A similar process, devised by Liebig, consists in digesting ammoniated mercury with sulphide of ammonium. N. Rep. Ph., No. 1, 1875, p. 39.

O. Hausmann recommends that corrosive sublimate be precipitated with caustic ammonia, and the mixture then treated with an excess of hyposulphite of sodium, heating, and partially evaporating. The handsomest vermilion is obtained between 70° and 80° C. (— 158° and 176° F.). Ph. Centralh., No. 9, 1875, p. 67.

It is a well-known fact that vermilion becomes darker by exposure to light. According to J. Heumanns the article prepared by the wet process becomes dark much more rapidly than does that prepared by sublimation. In alkaline solution, exposure to the light causes that prepared by the wet process to assume a black color in a few seconds, whereas the article prepared by sublimation requires several minutes.

The author has also found that vermilion is readily reduced to the metallic state by copper, either in form of foil or powder. Powdered zinc produces the same result more rapidly. Chem. Centralbl., No. 27, p. 418; from Ber. Chem. Ges.

## SILVER.

*Silver*, in the finely divided state in which it is obtained by the reduction of its chloride with zinc and hydrochloric acid, tenaciously retains water. To determine the quantity it is capable of retaining, A. Vogel placed a weighed quantity of perfectly dry powdered silver upon a paper filter, poured water upon it, and, after allowing it to drain completely, he thus found that it was capable of retaining 80 per cent. of its weight of water. The moist silver, after subjecting it to drying at  $100^{\circ}\text{C}$ . ( $= 212^{\circ}\text{F}$ .) for three hours, still retained 15 per cent. of water; after five hours, 10 per cent.; after twelve hours, 7 per cent., and he finds it necessary to heat it on a paraffin-bath to  $210^{\circ}\text{C}$ . ( $= 410^{\circ}\text{F}$ .) before it again was reduced to its normal weight. N. Rep. Ph., 1874, No. 5, p. 263.

*Precipitation of Silver in the Metallic State.*—The usual action of metallic oxide upon solutions of silver salts results in the precipitation of silver as oxide. Ebelmen has shown, however, that *protoxide of uranium* produces in solutions of nitrate of silver a deposit of metal, exactly as does copper, one equivalent of uranium replacing one equivalent of silver, without escape of gas. Isambert has repeated Ebelmen's experiments, and finds his results completely correct. A bulky precipitate is formed upon the addition of oxide of uranium, and the liquid becomes first green, but after a time assumes the yellow shade characteristic of a sesquisalt of uranium. At the same time the precipitate becomes compact, and passes from the state of oxide to the metallic state. *Hydrated protoxide of iron* produces, in like manner, a precipitate of metallic silver, with formation of sesquioxide of iron. Ch. News, May 28th, 1875, p. 239; Compt. Rend., April 26th, 1875.

*Peroxide of Silver.*—According to Böttger peroxide of silver, obtained by electrolysis from concentrated solutions of the nitrate, decomposes ammoniacal solutions with rapid evolution of nitrogen, and formation of solution of fulminate of silver. A small quantity of this solution may be evaporated in an iron spoon over a Bunsen burner, a harmless explosion resulting finally. When a small quantity of the finely powdered

and dry peroxide of silver is moistened with a few drops of oil of cloves, the latter is inflamed, and the peroxide is reduced to the metallic state. Arch. Ph., May, 1874, p. 450.

*Chloride of Silver.*—The determination of the solubility of chloride of silver in various salts and acids, by Mulder some years ago, seemed to A. Vogel sufficiently interesting to be repeated and extended. The author accordingly has made a series of experiments in which the solubility of chloride was determined by the following method: One-tenth normal nitrate of silver solution was allowed to flow, from a fine graduated burette, into 10 c.c. of various solutions of a determined concentration, until permanent turbidity was produced. From the amount of silver solution so used, the solubility of the chloride of silver in them was readily calculated. The saline solutions were saturated at the ordinary temperature by dissolving the respective salts in hot water, and decanting the solution from the crystals which were deposited on cooling. The following are the results so obtained at ordinary temperature:

100 parts chloride of barium dissolved		0.0148 parts chloride of silver.				
"	chloride of strontium	"	0.0884	"	"	"
"	chloride of calcium	"	0.0980	"	"	"
"	chloride of sodium	"	0.0950	"	"	"
"	chloride of potassium	"	0.0472	"	"	"
"	chloride of ammonium	"	0.1675	"	"	"
"	chloride of magnesium	"	0.1710	"	"	"
"	mur. acid, sp. gr. 1.165,	"	0.2980	"	"	"

According to these results it appears that only the chlorides of ammonium and of magnesium, and muriatic acid possess sufficient solvent action to render the usual methods for the determination of silver inaccurate. By repeating the experiments with muriatic acid of various degrees of dilution, he found that it lost its solvent action in proportion to the amount of dilution. The following chlorides were found to possess no solvent action whatever: The chlorides of tin, mercury, copper, zinc, cadmium, nickel, and cobalt. N. Rep. Ph., No. 6, 1874, p. 335.

*Nitrate of Silver.*—The contradictory statements in regard

to the reaction of hydrogen upon nitrate of silver solutions, has induced A. Pellet to experiment, and he has found that while in cold silver solutions a faint precipitation is almost always produced, such precipitate is due to the presence of a little oxide of silver, in the absence of which no precipitation is produced. Arch. Pharm., April, 1875, p. 364; J. de Pharm. et de Chim.

*Nitrate of Silver Crayons.*—E. Bouilhon has given the preparation of nitrate of silver crayons for the purpose of a cautery especial attention, and concludes that the crayons best serve the purpose they are intended for, if they are perfectly neutral. He has found that perfectly neutral pencils can only be obtained by proper precautions. Twenty grams of pure nitrate of silver, 5 or 6 grams of distilled water, and 1 gram of pure nitric acid are heated in a porcelain capsule, with care not to overheat the sides of the capsule, which would cause the decomposition of a portion of the nitrate and the blackening of the mass. The water and acid evaporate, the salt becomes dry, and as soon as the fusing-point is reached begins to melt. At this point it is necessary to conduct the operation very carefully, to heat very moderately, and to detach from the sides of the vessel with a glass rod the crusts of dry salt which do not run into the liquid. When about three-fourths of the salt is melted it is to be run immediately into a perfectly clean copper mould not containing any organic matter. Crayons are thus obtained which are of a dead-white color, and of irreproachable solidity. Ph. Jour. Trans.; from Rép. de Ph., vol. ii, p. 134.

*Sulphate of Silver and Aluminium, Silver alum.*—Sergius Kern has obtained it, in the form of octohedral crystals, by heating upon a sand-bath a solution of equivalent quantities of sulphate of silver and sulphate of aluminium, and allowing the solution to crystallize. The *sulphate of silver* for the experiment was prepared by treating a concentrated solution of nitrate of silver with sulphuric acid, sp. gr. 1.84, and evaporating the solution to dryness. A white powdery product was obtained, which was soluble in 90 parts of water, and very easily soluble in ammonia. Both the ammonium and



the aluminium silver alums are very unstable compounds, very easily decomposing into the original salts. Ch. News, May 14th, 1875, p. 209.

#### THALLIUM.

*Iodides of Thallium.*—Th. Knösel has obtained three compounds of iodine with thallium: A green fusible iodide,  $\text{Tl}_2\text{I}$  ( $\text{O} = 16$ ), which sublimes readily, forming transparent amorphous masses of a red color, which in contact with water become green; a yellow iodide,  $\text{TlI}$  ( $\text{O} = 16$ ), which sublimes, forming yellow masses; and a black iodide,  $\text{TlI}_3$  ( $\text{O} = 16$ ), which yields also yellow masses, and gives off iodine vapor. Ch. News, August 7th, 1874, p. 66; from Ber. d. D. Ch. Ges., 1874.

#### PLATINUM.

*Platinum.*—E. Reichardt has analyzed a piece of a new platinum retort, which was characterized by a brittle and crystalline structure, owing to which the retort could not be used. The specific gravity of the metal was found to be 20.905; it was not as bright as ordinary platinumfoil, and was not changed by heating to redness. One hundred parts were found to contain: Platinum, 99.430; copper, 0.473; iron, 0.013; silicium, 0.030. As both sulphur and phosphorus were not present, and neither the iron or copper could influence the ductility of the platinum, the cause of the brittleness of the particular specimen of platinum is ascribed by the author to the silicium. He is supported in his view by the observation in Gmelin's Handbook of Chemistry, where it is stated that when silicium is present in platinum to the amount of one per cent., it imparts to it great brittleness, etc. Arch. Ph., August, 1874, p. 123.

*Bichloride of Platinum.*—G. Krause gives this method for obtaining perfectly pure bichloride of platinum from the laboratory residues at Stassfurt. The precipitates and alcoholic washings from previous potassium determinations are mixed, heated in a capsule, and treated with bicarbonate of sodium, which must be free from sulphuric acid, and in fact chemic-

ally pure. The mixture, being frequently stirred, is then rapidly heated to boiling, when suddenly the platinum is completely reduced. The boiling is continued for a short time, and the platinum is then allowed to settle completely, which requires four to six hours. The clear liquid is decanted, the residue is boiled with water, allowed to settle, and separated by decantation; is then washed in the same way with water acidulated with muriatic acid, then with strong muriatic acid, and finally twice more with distilled water. The platinum-black is then transferred to a filter, washed with hot distilled water until a drop of the filtrate, evaporated on platinumfoil, leaves no residue, and is then carefully dried at the ordinary temperature; or it may be immediately converted into bichloride, which operation, however, requires great care. The platinum-black is washed into a flask with five parts of hydrochloric acid; the flask is transferred to a water-bath, which is maintained at gentle ebullition, and nitric acid, of which about one part is required, is added in portions of one to ten drops at a time, until the solution is effected. If the nitric acid is added too rapidly, the mixture is very apt to froth over, as the action on platinum-black is exceedingly energetic. The solution is filtered, evaporated on a water-bath to such a condition that a portion taken out will congeal. A little muriatic acid is then added, from time to time, until the last traces of nitric acid are completely removed. Arch. Pharm., November, 1874, p. 412.

When endeavoring to utilize platinum residues in a manner similar to that above indicated, G. Vulpus, boiling the platinum precipitates with soda and alcohol, obtained a brownish powder instead of perfectly reduced platinum-black, notwithstanding that he boiled the mixture for a considerable time. He therefore endeavored to reduce the brown mass by heating to redness, and succeeded in obtaining an unexceptional spongy platinum. The operation was, however, attended with a peculiar effect, the powder adhering to the sides of the porcelain crucible becoming suddenly ignited, and this soon communicated to the entire mass, burning with a flame resembling a benzol light, and giving off copious white

and odorous vapors. The platinum precipitate was the ammonio-chloride, obtained by the separation of chloride of ammonium formed during the preparation of chloride of hydroxylamin from nitrate of ethyl by means of tin and hydrochloric acid. Ibid., p. 417.

#### PALLADIUM.

*Palladium.*—Troost and Hautefeuille have determined that the absorption of hydrogen by palladium is accompanied by the formation of a definite compound, corresponding to the formula  $\text{Pd}_2\text{H}$  ( $\text{O} = 16$ ). This compound is capable of taking up further quantities of hydrogen, varying with the state of division of the metal. The varying results of Graham, according as he used palladium in the form of sponge or wire, are thus explained. Arch. Pharm., Jan. 1875, p. 61; Jour. de Ph. et de Chim.

*Sulphite of Palladium and Sodium.*—Wöhler has made the observation that when sulphurous acid is mixed with a solution of protochloride of palladium, the solution becomes of a light yellow color, and if then hydrate of sodium is gradually added, a voluminous nearly white precipitate is formed, which increases gradually and finally becomes crystalline. This, upon analysis, proved to have the formula  $= \text{PdO}, \text{SO}_2 + 3\text{NaO}, \text{SO}_2 + 2\text{Aq}$ . It forms a light yellowish-white powder, is soluble in excess of either sulphurous acid or caustic alkali, and is soluble also in water, but in the latter instance is decomposed. Ch. Centralbl., No. 51, 1874, p. 803.

#### IRIDIUM.

*Iridium.*—An alloy of 9 parts of platinum and 1 part of iridium has been adopted by the international commission for the construction of normal metrical weights and measures; such an alloy being extremely hard, as elastic as steel, more difficult to melt than platinum, and unchangeable. The production of the large quantity of iridium necessary for this purpose—25 kilograms—engaged the attention of Deville and

Debray, who were assisted by J. Clément, and they have succeeded in furnishing that quantity by the following method:

Platinum ore, which is composed of an alloy of various metals, mixed with sand and grains of *osmium-iridium*, was treated with nitro-muriatic acid, which extracted the platinum, and left the osmium-iridium mixed with other metals and 60 to 75 per cent. of sand. This mixture was melted with litharge, silicic acid, and a little carbon, when the sand formed a glass with the litharge and silicic acid, and the osmium-iridium united with reduced lead and settled beneath the glass which had formed. Upon treatment of the lead alloy with nitric acid, the osmium-iridium remained in metallic grains. In this form it cannot be powdered by ordinary mechanical means, and it was, therefore, melted with zinc, and the alloy subjected to distillation, by which the osmium-iridium was left in the form of an impalpable powder, and in a condition to be submitted to the action of alkalies and powerful oxidation agents necessary to render it soluble. It was then heated to redness with nitrate of barium; the mixture melting and forming, on cooling, a readily pulverizable mass, composed of oxide of iridium and osmiate of barium. This mass was dissolved in nitric acid, and the solution subjected to distillation, whereby the osmic acid was obtained in large white crystals. This part of the operation must be conducted with great care, since osmic acid is highly poisonous. It must be preserved in hermetically closed glass tubes. The red liquid remaining in the retort after the distillation, contains the nitrate of barium and oxide of iridium. The latter is precipitated by baryta, washed, dissolved in nitro-muriatic acid, and treated with chloride of ammonium. The ammonio-chloride of iridium is heated to redness, and spongy iridium, containing a little platinum, ruthenium, and rhodium, is obtained. To remove the last two metals, the ammonio-chloride is heated to redness with saltpetre, the mass is treated with water, which dissolves rutheniate of potassium; the residue is melted with lead and allowed to cool. Pure iridium crystallizes out, which, when removed, is (mechanically?) contaminated with lead and platinum. The lead is

removed by nitric acid; the platinum by nitro-muriatic acid, which leaves the iridium in a pure crystalline condition. Ph. Centralhalle, No. 50, 1874, p. 409.

#### RHODIUM.

*Rhodium*.—H. Saint Claire Deville and H. Debray announce the following new property of this metal when in the finely divided metallic state, in which it is obtained by throwing down its solutions by formic acid or alcohol. Rhodium, in the state in question, decomposes formic acid with evolution of heat, reducing it to hydrogen and carbonic acid. At a slightly higher temperature pulverulent rhodium transforms alcohol in contact with alkalies, hydrogen being given off, and an alkaline acetate formed, even in very dilute liquids. When the action of rhodium upon formic acid becomes enfeebled, it is merely necessary to wash the metal and dry it in contact with air, to restore it to its full efficacy. Platinum and palladium, prepared in a similar manner, have no effect upon formic acid, while iridium and ruthenium act like rhodium. Ch. News., Aug. 21st, 1874; from Compt. Rend., June 29th, 1874.

#### OSMIUM.

*Osmium*.—According to Henry St. Claire Deville, osmium is the most deadly poison known, and is all the more dangerous because there is no known antidote for it. The author submitted to the French Academy a tightly closed vial, containing about 15 pounds of the metal, nearly enough to poison three-fourths of the entire population of the globe. One thousandth part of a grain, diffused through a volume of 100 cubic yards of air, would be sufficient to poison all persons inhaling it. Am. Drug. Circ., Oct., 1874, p. 174.

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### ORGANIC CHEMISTRY.

#### HYDROCARBONS.

*Petroleum*.—It is stated in Les Mondes, April 30th, 1874, that the addition of one part of chloroform to five parts of

petroleum renders the mixture incapable of combustion until the former body has been evaporated away, and that a litre of burning petroleum, spread out over a surface of 10 square centimetres, is extinguished by throwing upon it 50 c.c. of chloroform. Ch. News, July 17th, 1874, p. 31.

*Paraffin.*—A. G. Pouchet has examined the products obtained by the action of nitric acid upon paraffin. By acting upon the paraffin with fuming nitric acid of 47° B., at a temperature not above 110° C. (—230° F.), a mass of a buttery consistence is formed, which is composed of products soluble in water and a product insoluble in water. The former contains prominently caproic acid, and besides, caprylic, caprinic, butyric, suberic, valerianic, oenanthic acid, etc. The insoluble portion is composed of paraffinic acid, associated with volatile fatty acids, and their nitro derivatives. Based upon the composition of the paraffinic acid, the author defines the formula of paraffin as  $C_{48}H_{50}$ , and he regards it a definite chemical compound, and not a mixture of various hydrocarbons. (See Paraffinic Acid, in this report.) Ph. Centralhalle, No. 47, 1874, p. 385.

*Heavy Coal-tar Oil an Antiseptic.*—L. Dusart communicates to Compt. Rend. (t. 79, p. 229) his experiments with that portion of coal-tar which boils between 210–300° C. (—410–572° F.). It constitutes a liquid, which, when deprived of naphthalin, is mobile, heavier than water, of a reddish color, and relatively faint odor. It is insoluble in water, but communicates to it its peculiar odor. It seems to possess powerful antiseptic properties, a very small percentage, added to decomposing excrements, arresting decomposition, and removing the odor. Chem. Centralbl., No. 37, p. 587.

*Benzol and other coal oils*, produced by the destructive distillation of coal, seem to be well adapted for the preparation of various alkaloids, and proximate vegetable principles, without the intervention of alcohol. Boiraux and Léger have successfully employed them for this purpose; and the methods of their employment, for the isolation of various principles, will be found in this report, under the headings of the sub-

stances the authors have isolated. They have employed in their investigation:

1. The oils boiling between  $50^{\circ}$  and  $100^{\circ}$  C. ( $= 122^{\circ}$  and  $212^{\circ}$  F.), known in commerce as benzol;
2. That portion of the oil which passes between  $80^{\circ}$  and  $120^{\circ}$  C. ( $= 176^{\circ}$  and  $248^{\circ}$  F.); and
3. The preceding, with the addition of 5 per cent. of carbolic acid.

The first of these is designated by the author as "benzol;" the second as "coal oil;" and the last as "carbolized coal oil." Ph. Jour. Trans., Feb. 1875, p. 643.

*Coal Benzin and Petroleum Benzin.*—Iodine is the best reagent to distinguish between benzin from coal (benzols) and petroleum benzin. If a small crystal of iodine is added to benzol contained in a test-tube it is dissolved with a violet color; added to petroleum benzin it dissolves with a raspberry red color. If a mixture of the two it will be a color intermediate between the two, but the red prevails to such an extent that even small quantities of benzin may thus be recognized. Ph. Centralh, No. 16, 1875, p. 130.

*Cymene.*—During a comprehensive series of experiments, brought to the notice of the British Pharmaceutical Conference at various times, sixteen different specimens of cymene have been obtained, by C. R. A. Wright, by one or other process from different substances, all constituents of essential oils, and all either members of the class of terpenes, or closely related to them. The specific gravity, specific refractive energy, and specific dispersion of them have been taken by Dr. Gladstone, all the specimens being found to agree closely together; the boiling-point of each specimen has been found to be very close to  $176.5^{\circ}$  C. ( $= 349.7^{\circ}$  F.), and in every case the action of bichromate of potassium and sulphuric acid was the same, viz., the production of terephthalic acid (about 40 per cent. on an average), free from isophthalic acid, and of acetic acid free from all traces of higher homologues. Mr. Wright concludes that cymene, thus producible, is in every case the same body; and that the terpenes and their deriva-



tives, of formulæ  $C_{10}H_{16}O$  and  $C_{10}H_{14}O$  ( $O=16$ ), are closely related to cymene, which may, indeed, be looked upon as the central form of matter from which all these classes of substances are derived. Proc. Br. Ph. Conf., 1874, p. 632.

*Colophthalin*.—Among the final products of the destructive distillation of common resin, is a solid hydrocarbon which has been generally spoken of as *naphthalin*, but which Paul Curie proposes, as obtained from this source, to call *colophthalin*. It is formed in but small quantities when, in the preparation of resin oils, the colophonium is submitted to slow distillation; but if the decomposition is rapid, and at a red heat, it is formed in much larger quantities. It may be obtained, however, in very large quantities by heating together 100 parts of resin and 50 parts of sulphur. Sulphuretted hydrogen is abundantly evolved during the gradual heating between  $150^{\circ}$  and  $200^{\circ}$  C. ( $=302^{\circ}$  and  $392^{\circ}$  F.). When no more HS is disengaged, the heat is increased to  $400^{\circ}$  C. ( $=762^{\circ}$  F.); a fresh quantity of HS is produced, and at the same time colophthalin, together with a small quantity of liquid hydrocarbon, distils over. About 30 per cent. of pure solid hydrocarbon is thus obtained from the resin. The liquid product is removed by its more ready solubility in alcohol.

Pure colophthalin is a white body, of a slight balsamic odor, easily soluble in benzol, naphtha, spirit of turpentine, bisulphide of carbon, and ether. Alcohol and glacial acetic acid dissolve it at their boiling-point, but deposit it again on cooling. It melts at  $70^{\circ}$  C. ( $=158^{\circ}$  F.); boils at  $400^{\circ}$  C. ( $=752^{\circ}$  F.); and has a composition corresponding to the formula  $C_{22}H_{10}$ . Oxidizing agents, chlorine and nitric acid, attack it with great facility, and form the following compounds:

*Oxycolophthalin*, a non-volatile, orange-yellow, crystalline substance, slightly soluble in cold alcohol, and freely dissolved by boiling alcohol, in ether, bisulphide of carbon, etc. Prepared by acting upon a solution of colophthalin in acetic acid with bichromate of potassium and sulphuric acid. Composition  $= C_{22}H_8O_2$ .



*Chloro-colophthalin*, a viscous, grayish-yellow body, obtained by gently warming colophthalin with chlorine, or with chlorate of potassium and hydrochloric acid. Composition —  $C_{22}H_8Cl_2$ .

*Nitro-colophthalin*, an ochre-colored, resinous, non-volatile, and uncrystallizable substance, obtained by heating the hydrocarbon with nitric acid until dissolved therein. On allowing the solution to cool, the nitro compound precipitates. It is slightly soluble in dilute acids, completely in concentrated acid, and in ether, benzol, bisulphide of carbon, etc. It is soluble in caustic alkaline solution, but by boiling these solutions is changed into an acid, which the author has named *coloph-ulmic acid*.

The most remarkable reaction of these compounds, the oxo-, chloro-, and nitro-colophthalin, as well as the coloph-ulmic acid, is that produced by melting hydrate of potassium. They are transformed into a white amorphous body of decided basic properties, having so exactly the appearance of alumina, that it might easily be mistaken for that metallic oxide. Hence the author claims for the new substance the name of

*Coloph-alumina*.—This is insoluble in all neutral liquids, water, spirits, ether, etc.; is infusible; resists the action of oxidizing agents, and is not decomposed at a temperature of even  $1000^{\circ} C.$  ( $-1832^{\circ} F.$ ). Its basic properties are not very energetic. It is readily dissolved by acids, but its solutions cannot be concentrated without dissociating the acid and base. Its formula of composition has not been obtained by direct analysis, but is calculated to be  $C_{20}H_6O_4$ . By heating it with concentrated sulphuric acid, or by passing chlorine through a portion, heated to redness in a porcelain tube, compounds are produced, in which two atoms of H are substituted by  $2SO_3$  and  $2Cl$  respectively. When these substitution compounds are fused with caustic potassa, they exchange their  $SO_3$  or  $Cl$  for oxygen, and a new body, possessing acid properties, is formed, which the author calls *coloph-aluminic acid*. Composition (calculated) —  $C_{20}H_4O_6$ . Ch. News, October 23d, 1874, p. 189.

## VOLATILE OILS.

*Volatile Oils.*—Miss Kate Crane has made some experiments on the cohesion-figures of oils, as suggested originally by Dr. Moffat in the Chemical News of 1869, and describes her experience in Am. Jour. of Pharm., Sept. 1874, pp. 406–409. The experiment is made by permitting a single drop of the oil to fall from a burette or glass rod upon the centre of a surface of water contained in a plate or other suitable vessel; the drop falling from a height of about four inches. There are certain characteristic differences in the figures assumed by the oils, which by a little patient practice soon become apparent to the eye of the operator. To make these figures perfect it is necessary to observe the time in forming, for at different periods some varieties form figures very like, but with this precaution each is entirely characteristic. It is also essential that the dish used, etc., be perfectly clean, so that when filled with water no dust or lint floats on the surface, and thus materially interferes with the perfect formation. The oils of cinnamon, nutmeg, peppermint, and bergamot were so examined both in their pure state and in variable admixture with oil of turpentine. Characteristic figures were obtained with all of the oils in their pure condition, while in admixture with oil of turpentine they varied according to the quantity of the latter. Characteristic figures were also obtained with a number of fixed oils: cod-liver, castor, croton oil, etc., both pure and adulterated.

*Japanese Oil of Peppermint.*—Oppenheim had made the statement that the so-called *crystallized oil of peppermint* from Japan, was adulterated with from 10 to 20 per cent. of sulphate of magnesium, which salt it closely resembles. Mr. J. Moss has since had an opportunity to examine an authentic specimen, which corresponds in the main with that examined by Oppenheim, having a boiling-point at  $215^{\circ}\text{C.}$  ( $=419^{\circ}\text{F.}$ ), melting at  $39^{\circ}\text{C.}$  ( $=102.2^{\circ}\text{F.}$ ), and resolidifying at  $37.5^{\circ}\text{C.}$  ( $=99.5^{\circ}\text{F.}$ ); but it was found to be entirely free from inorganic impurities, and if any, only contained impurities natural to the oil. The author exposed some *liquid Japanese oil of peppermint* to a

temperature below  $0^{\circ}\text{C}$ . ( $= 32^{\circ}\text{F}$ .), but failed to observe any tendency to crystallization. Hence he infers that the latter is oil which has already yielded such crystals as it is readily capable of doing, and that the two varieties are obtained from one and the same source. *Ph. Jour. Trans.*, Nov. 7th, 1874, p. 366.

Mr. John Mackay submitted some samples of solid and liquid Japanese oil of peppermint, obtained from the same source as Mr. Moss's samples, at a meeting of the Pharm. Society of Great Britain (North British Branch). The *solid oil* comes from Japan in cylindrical canisters, but has not yet been imported for sale; it is apparently simply a deposit from liquid oil, formed probably at a low temperature, and appears from numerous experiments that have been made, such as the fusing and boiling point, sparing solubility in water, solubility in ether, alcohol, bisulphide of carbon, fatty and essential oil, etc., identical with that submitted to the Chemical Society in 1862 by Oppenheim; but is free from any adulterating ingredient. Dumas, who examined the stearopten of American oil of peppermint, and Attfield, who believes peppermint camphor or menthene to be identical as obtained from various sources, also agree in their description of the stearopten with that given by Oppenheim for the Japanese article. There can, therefore, be little doubt as to the identity of peppermint camphor (menthene or methol, as it is variously called), whether obtained from European, Chinese, Japanese, or American sources. The author found this solid oil to be readily soluble in two parts of alcohol, and finds that, though pungent to the palate, it is disagreeable and wanting in the aroma and flavor possessed by fine oil of peppermint.

Regarding the *liquid Japanese oil*, the author found it the best in flavor, etc., after the English (Mitcham), American oil being inferior to the two, it mixing with alcohol,  $56^{\circ}\text{O. P.}$ , in all proportions, and is capable of dissolving one-fourth its weight of the solid oil. *Ph. J. Trans.*, April 17th, 1875, p. 821.

*Oil of Peppermint*.—A. Frebault has observed that when an alcoholic solution of picric acid is added to oil of peppermint,

the yellow color first produced gradually changes to green, becoming magnificently green in half an hour, and intensely so at the expiration of twenty-four hours. The coloration appears more rapidly if heat is applied. The color possesses a decided red fluorescence, and the reaction of the oil with picric acid is so clear that the author suggests its application as a test for oil of peppermint in mixtures of essential oils. Ten centigrams of picric acid dissolved in 50 grams of water, when added to two grams of a mixture of essential oils containing two drops of oil of peppermint, caused the mixture of oils, floating on the surface of the water, to assume a very perceptible green tint after standing twenty-four hours.

If instead of operating in the cold, or by gentle heat, the solution of picric acid and oil of peppermint is boiled for a few moments, it passes from the green state to yellow-brown, and then reddish-brown. Upon the addition of ammonia it quickly forms red crystals, probably picramate and a little picrate of ammonium, in the midst of which a beautiful red amorphous powder is disseminated, which is insoluble in oil of turpentine and in benzin; sparingly soluble in ether and in alcohol, but soluble in water. With a view to further elucidate the question of what the coloration is due to, the author appends the following observations upon the action of other acids on oil of peppermint:

*Sulphuric acid* produced at first a rose-red color, then reddish-yellow, passing rapidly to reddish-brown. When ether was added it acquired a beautiful yellow color, whilst the lower portion of the mixture was colored red. When water was added and the mixture shaken the liquid separated into two layers, of which the lower acid aqueous layer was rose-colored, and the uppermost ethereal layer took a greenish-blue tint and had a strong red fluorescence.

*Hydrochloric acid* induced a rose-red color rather slowly. Upon the addition of ether this became faintly green, and this color was retained by the ether when water was added, the latter acquiring a rose-red color. In some experiments a blue color was produced.

Nitric acid caused first a rose coloration, then red, soon

becoming greenish. Upon adding ether and water and shaking, the underneath layer was rose, and the ether assumed a violet-blue gray color. The blue and green tints were rapidly altered by the action of air and light. The observations were made with pure and quite colorless oil of peppermint. When the yellow or greenish-yellow tinted oils of commerce were employed, the phenomena of coloration were much more intense with sulphuric and hydrochloric acids; whilst with nitric acid the ethereal layer acquired a magnificent green color and strong red fluorescence.

The author's theory of the action of acids on oil of peppermint is to the effect, that they possess the power of splitting up the oil into five coloring principles, red, blue, green, yellow, and violet; and that, according to the quantity and nature of the acid employed, one or the other of these principles is obtained, or perhaps a gray, resulting from a mixture of two complementary colors.

Furthermore, the author compares the reactions and characteristics of the green coloring matter formed with chlorophyll, and finding very close analogy, endeavors to explain the formation of the latter in the oil of peppermint. A. J. Ph., Aug. 1874, pp. 363-567; Rep. de Ph.

*Oil of Peppermint.*—C. Roucher has found that when 1 part of oil of peppermint is mixed with 20 parts of acetic acid (containing 10 per cent.), and the mixture is then shaken, it will acquire a faint blue color in the course of a half to one hour, and this becomes gradually more intense. The liquid at the same time shows a very plain dichroism, appearing blue by transmitted, and vermilion-red by transmitted, light. The blue color is, however, not permanent, but changes gradually to green, and then yellow. The blue liquid, when filtered, leaves a blue residue upon the filter, which changes rapidly to red, and finally becomes colorless. Mesithol (menthol, peppermint camphor) does not produce this reaction. Neither does oil of turpentine, oil of lemon, or ordinary camphor. It is to be regretted that the author did not operate with an oil of undoubted source, since he states that it may have contained

a portion of oil of balm mint (*Mentha crispa*). *Zeitschr. Oest. Apoth. Ver.*, Feb. 10th, 1875, p. 83.

*Oil of Peppermint.*—The iodine test for the purity and freshness of oil of peppermint is the subject of comment by K. Calmberg, who has found that, while perfectly pure and recently prepared samples will stand the test very well when the relative quantity of iodine to oil is small, all of them will be decomposed with heat and elimination of vapor when 3 to 4 drops are brought in contact with about one-half gram of iodine. He therefore suggests that if the process is to be of value, the relative quantities of the oil and reagent must be determined. *Arch. Ph.*, Aug. 1874, p. 127.

*Oil of Peppermint—Action of Chloral Hydrate.*—The peculiar color reaction of chloral hydrate on oil of peppermint, first noticed by Jehn, having been criticized by several authors, Dr. Jehn repeated his experiments with German, English (Mitcham), and French oils of peppermint of undoubted purity. He had, in his original experiment, operated with French oil of peppermint, and he now finds that the sample of French oil, obtained since then, produces precisely the same color reaction, *i. e.*, reddish, red, and, finally, red-brown. The German oil assumed, under precisely the same conditions, a light-brown color, whilst the English oil assumed a still lighter color. Prof. Flückiger, who the author thinks has operated with German oil, obtained only a yellowish-brown color. Hager, in his *Commentar zur Ph. Germ.*, declared the statements of Jehn to be erroneous.

The following are the reactions as observed by the author on the three different oils, equal parts of the oil and of chloral hydrate being used:

English oil.	German oil.	French oil.
The turbid mixture is light-brown, approaching to gray, and affords a brownish-red filtrate.	The mixture is turbid, but not so much as either of the others, and of a light raspberry-red color, as is also the filtrate.	The mixture is very turbid, of a brown color, closely resembling suspended hydrated oxide of iron. The filtrate is brown.

*Arch. Ph.*, Oct. 1874, p. 326.

*Monobromated Camphor.*—According to Gault, the high temperature indicated by Perkin and by Maisch as necessary to its formation is exaggerated, its formation taking place readily below  $100^{\circ}\text{C.}$  ( $= 212^{\circ}\text{F.}$ ). The operation may be divided into four stages: 1. Formation of bibromated camphor. 2. Reaction, giving rise to monobromated camphor, at a temperature below  $100^{\circ}\text{C.}$  ( $= 212^{\circ}\text{F.}$ ). 3. Purification by washings and crystallization. 4. Utilization of a secondary product (Swarts's hydrobromate of camphor bromide). The formation of bibromated camphor presents no difficulty. It is effected by the simple addition of bromine to camphor. Maisch uses a small quantity of alcohol, but this the author thinks is unnecessary. The camphor, previously powdered, is introduced into a retort about ten times the capacity of the volume of bibromated camphor to be formed, and upon this powder the bromine is poured in a thin stream, with constant stirring, until the camphor is all liquefied; under these conditions approximately two molecules of bromine to one of camphor will be employed. The clearness of the reaction, which is indicated by the liquefaction, dispenses with the necessity of weighing, whilst a slight excess of one or the other of the ingredients has not been found to influence the final product. The conversion of the bibromated into the monobromated camphor is effected in the same retort, to which is adapted a long and large abductor-tube, dipping into an alkaline solution; this has for its object the absorption of all inconvenient vapors. The retort is placed in a water-bath, which is heated to ebullition. The reaction quickly manifests itself, and is accompanied by the disengagement of torrents of hydrobromic acid gas, and some vapors of undecomposed camphor and bromine. The dark-brown liquid acquires an amber color, and the evolution of gas slackens suddenly. The temperature of the reaction could not be accurately determined, but the author is certain that it commenced between  $80^{\circ}$  and  $90^{\circ}\text{C.}$  ( $= 176^{\circ}$  and  $194^{\circ}\text{F.}$ ), and did not reach  $132^{\circ}\text{C.}$  ( $= 269.6^{\circ}\text{F.}$ ). He insists upon attention to this latter point, because he is convinced, by comparison with other processes, that the quantity of oily product is thus notably diminished, and that the



purification of the monobromated camphor is rendered more easy. The amber liquid which remains in the retort solidifies on cooling, and forms a friable and slightly citrine mass. If the contents of the retort be thrown into a capsule, the disengagement of hydrobromic acid continues during several hours, and the mass presents an energetic reaction. But if the same liquid be thrown into boiling distilled water, and the ebullition be continued some time in the open air, the hydrobromic acid gas is nearly entirely removed from the mass, and the last traces of bromine vapor by which it might be contaminated are driven off. The product is then nearly white. The volatilization of monobromated camphor by the intervention of the vapor of water, alluded to by Maisch, is not so notable as to counteract the advantage of this first stage of purification. To obtain the product colorless and crystalline, decolorization by animal-black, or repeated crystallization from boiling  $90^{\circ}$  to  $95^{\circ}$  alcohol may be resorted to. The author prefers the latter method. He finds the melting-point of his product to be between  $69^{\circ}$  and  $70^{\circ}$  C. ( $= 156.2^{\circ}$  and  $158^{\circ}$  F.). It boils at  $274^{\circ}$  C. ( $= 525.2^{\circ}$  F.), with partial decomposition. Heated to  $100^{\circ}$  C. ( $= 212^{\circ}$  F.), it should not give a sublimate of camphor.

The secondary product, the oily hydrobromate of camphor bromide, is utilized by the author by heating it to near the temperature indicated by Perkin for the preparation of monobromated camphor. After being heated to a temperature between  $200^{\circ}$  and  $220^{\circ}$  C. ( $= 392^{\circ}$  and  $428^{\circ}$  F.), a black viscous mass is formed, which upon cooling becomes solid and brittle. Treated with boiling alcohol this mass yields colorless crystals of monobromated camphor. Ph. Jour. Trans., Oct. 24th, 1874, p. 321.

*Monobromated Camphor.*—The following improved method is proposed by Ed. Dubois, by which the direct combination of bromine and camphor is quite regular, and the product obtained is, at  $100^{\circ}$  C. ( $= 212^{\circ}$  F.), very evenly resolved into the monobromated compound and hydrobromic acid. 75 grams of camphor is introduced into a flask, and 80 grams of bromine is at once added. The two substances unite with a



slight elevation of temperature, and the mixture becomes liquid. After standing two to three hours the mixture is heated on a water-bath to  $100^{\circ}$  C. ( $= 212^{\circ}$  F.), the hydrobromic acid being collected in a suitable receiver. Violent reaction takes place at first, by which some bromine is carried over, but after a few minutes the reaction slackens, and becomes so regular that the process may be allowed to go on without attention. There exists no danger of explosion, if vessels of about a litre capacity are used. When the reaction is completed the contents of the flask are treated with a warm solution of carbonate of sodium, then dissolved in boiling alcohol, filtered, and allowed to cool. Handsome white and large needles of pure monobromated camphor are deposited. No by-products of any consequence are formed. Ch. Centralbl., No. 32, 1874, p. 499.

*Monobromated Camphor.*—J. U. Lloyd recommends the following process for its preparation: Into a half-gallon retort introduce fourteen avoirdupois ounces of powdered camphor, and pour upon it by fractions eight avoirdupois ounces of bromine, agitating after each addition, then add ten fluid ounces of warm distilled water, and place the retort upon a sand-bath, allowing the neck of the retort to project into a flue, or the open air, that the hydrobromic acid which forms may escape (!). Now apply heat until the liquid within the retort boils, and continue the boiling until the water is about driven off—to accomplish this will require nearly two hours—and then the contents of the retort will be of a deep amber color, almost transparent. The ebullition will be attended with violent splashing and bumping. The heat must now be discontinued, and the retort allowed to cool somewhat, when its contents are poured into a dish, and agitated with sixteen fluid ounces of warm alcohol, and allowed to remain about twelve hours in a cool place to crystallize. The crystalline mass is separated from the liquid by filtration, and purified by recrystallization from sixteen ounces of hot alcohol, and repeating this if necessary. A. J. Ph., April, 1875, p. 165.

*Monobromated Camphor.*—J. De Montgolfier gives the fol-

lowing information respecting the chemical and physical properties of monobromated camphor: It is slightly soluble in cold alcohol, very soluble in chloroform, bisulphide of carbon, benzol, etc., sublimes a little above its fusing-point, forming beautiful, long, and slender needles. It is dissolved by sulphuric acid, and is reprecipitated by water without alteration. It is not acted upon by ordinary nitric acid, but fuming nitric acid seems to decompose it. By slow crystallization from its solutions in alcohol or chloroform it is obtained only in very elongated and deformed crystals, but from boiling alcohol it crystallizes in right prisms with a rhombic base.

*Dibromated camphor.*—Montgolfier finds it most convenient to heat one equivalent of monobromated camphor, in sealed tubes, with four equivalents of bromine, although but two equivalents are absolutely required. The yield is always small. It sublimes perfectly at  $100^{\circ}\text{C.}$  ( $-212^{\circ}\text{F.}$ ), is less soluble in cold alcohol than monobromated camphor, and is soluble in chloroform, bisulphide of carbon, and benzol, and possesses nearly all the properties of the monobromated camphor. From boiling alcohol it is deposited in the form of a crystalline powder, but by slow crystallization from alcohol or chloroform it may be obtained in fine crystals, which are right prisms with rhombic base. Ph. Jour. Trans., June 26th, 1875, p. 1031; from Bull. de la Soc. Chim.

Dr. Valenti y Vivo has made a series of researches on the supposed antagonism between monobromated camphor and strychnia, and has arrived at the conclusion that monobromated camphor may be used as an antidote to *strychnia*. In case of poisoning it may be used in quantities varying from 4 to 6 grams, given in small doses. Ibid., p. 1032; from Med. Record and Siglo Medico, April 18th, 1875.

*Cubeb Camphor* (Stearopten).—Experiments made by Ed. Schaer and G. Wyss confirm in the main the results obtained by Schmidt in 1870. The stearopten does not pre-exist in the fresh berries or the oil obtained therefrom, but is produced by age both in the berries and oil. The analytical results support Schmidt's view of the constitution of this stearopten

which, unlike laurel camphor, is a hydrate of a hydrocarbon, corresponding to the formula  $C_{30}H_{48} + 2H_2O$  ( $O = 16$ ). From commercial oil, which had been freshly distilled from old cubebs, the authors failed to obtain the stearopten by artificial cold. They also observed, what has already been pointed out by Soubeiran and Capitaine, that oil of cubebs cannot be distilled alone without decomposition, to prevent which the presence of aqueous vapor is necessary. The same seems to hold good for the stearopten. The authors have not succeeded in confirming the rhombic crystalline form of the stearopten. Arch. Pharm., April, 1875, p. 316.

*Myristicin*.—The so-called stearopten of oil of nutmeg, usually known as myristicin, has been the subject of experiments by Prof. Flückiger, who finds it to be really myristic acid, identical with that in the fixed oil of nutmeg (trimyristicate of glyceryl). The article subjected to examination was obtained by Messrs. Herring & Co., of London, it appearing along with the volatile oil upon the aqueous distillate on the third day of distilling a large quantity of the ordinary nutmegs and long nutmeg (*M. fatua*). The presence of myristic acid in the distillate may be owing to the presence of free acid in the nutmeg, but is more probably produced by the decomposition of the fixed oil at the high temperature employed. The author, however, proves the presence of a little free myristic acid in the nutmegs.

*Myristicate of Sodium* had heretofore not been obtained in a distinct crystalline condition. The author obtained it without difficulty in thin prisms by allowing an alcoholic solution to evaporate slowly.

*Myristicate of Barium* is obtained as an amorphous precipitate when alcoholic solutions of myristicate of sodium and of acetate of barium are mixed.

*Myristicate of Silver* is likewise obtained in an amorphous condition when alcoholic solutions of the sodium salt and of nitrate of silver are mixed. Proc. Br. Ph. Conf., 1874, p. 490.

*Oil of Cassia*.—Hager recommends that oil of cassia be tested for its purity by agitating it with an equal volume of petroleum-benzin in a graduated test-tube. Pure oil of cassia

yields but about 2 per cent. to the benzin at a moderate temperature, while at a temperature of  $5^{\circ}$  to  $10^{\circ}$  C. ( $=41^{\circ}$  to  $50^{\circ}$  F.) none of it is dissolved. Fixed and volatile oils, resin oil, etc., may thus readily be detected. Benzol (coal benzin) dissolves somewhat more. The author, furthermore, finds that the authority of the German Pharmacopœia, that oil of cassia mixes with 90 per cent. of alcohol in all proportions, only holds good for *old* oil. He had opportunity to examine two cans of recently imported oil of undoubted quality, and found that while it mixed readily with one and a half volumes of such alcohol, the addition of a further quantity of the spirit caused turbidity. Ph. Centralhalle, No. 16, 1875, p. 131.

*Volatile Oil of Calamus* has been examined by A. Kurbatow, who obtained from the portion boiling below  $170^{\circ}$  C. ( $=338^{\circ}$  F.), after treatment with sodium, a terpin,  $C_{10}H_{16}$  ( $O=16$ ), boiling between  $158^{\circ}$  and  $159^{\circ}$  C. ( $=316.4^{\circ}$  and  $318.2^{\circ}$  F.), and having a sp. gr. of 0.8793 at  $0^{\circ}$  C. ( $=32^{\circ}$  F.). The portion boiling at a higher temperature was of a deep blue color, and not of a constant boiling-point. A. J. Ph., February, 1875, p. 65; from An. d. Chem.

*Oil of Cajeput* (*Melaleuca leucodendron*).—Schmidt has shown that the chief constituent of this oil is a body of formula  $C_{10}H_{18}O$  ( $O=16$ ), boiling at  $177^{\circ}$  C. ( $=350.6^{\circ}$  F.). C. R. A. Wright obtained a product boiling between  $176^{\circ}$  to  $179^{\circ}$  C. ( $=348.8^{\circ}$  to  $354.2^{\circ}$  F.), and, with various reagents, obtained results closely analogous to those obtained with its isomeric citronellol. Proc. Br. Ph. Conf., 1874, p. 632.

*Oil of Wormwood* (*Artemisia absinthium*, L.).—C. R. A. Wright found the pure oil to consist:

1. Of a terpin, about one per cent., boiling at about  $150^{\circ}$  C. ( $=302^{\circ}$  F.).
2. Of a second terpin, in smaller quantity, boiling between  $170^{\circ}$  and  $180^{\circ}$  C. ( $=338^{\circ}$  and  $356^{\circ}$  F.).
3. Of a few per cents of the "blue oils," boiling at  $300^{\circ}$  C. ( $=572^{\circ}$  F.) and upwards, together with a little resinous substance not volatile at  $350^{\circ}$  C. ( $=662^{\circ}$  F.).

4. Of the absinthol of Gladstone, the main constituent, isomeric with camphor and with myristicol. This he has found to boil at  $200^{\circ}$  to  $201^{\circ}$  C. ( $= 392^{\circ}$  to  $393.8^{\circ}$  F.). Gladstone and Leblanc had found higher boiling-points ( $204^{\circ}$  and  $217^{\circ}$  C. ( $= 399.2^{\circ}$  and  $422.6^{\circ}$  F.) respectively); and Beitstein and Kupffer had found it to boil at  $195^{\circ}$  C. ( $= 383^{\circ}$  F.). The author finds absinthol to differ from its isomeride myristicol, in that it is not appreciably altered in any way by repeated distillation. In other respects it is very similar. Proc. Br. Ph. Conf., 1874, p. 631.

*Oil of Citronella* (Andropogon Schoenanthus).—According to C. R. A. Wright, the essential oil of citronella is mainly composed of an oxidized oil, citronellol, boiling near  $210^{\circ}$  C. ( $= 410^{\circ}$  F.), and its composition corresponds with the formula  $C_{10}H_{18}O$  ( $O = 16$ ). It is altered by continual heating, becoming partially resinized, and losing the elements of water. The author considers it probable, however, that the constituents of the oil may vary according to the season, age of plant, etc., since Gladstone obtained a body boiling at  $199^{\circ}$  to  $205^{\circ}$  C. ( $= 390.2^{\circ}$  to  $401^{\circ}$  F.), and giving numbers agreeing with the formula  $C_{10}H_{16}O$  ( $O = 16$ ). The author also draws attention to the bromine, chlorine, and sulphur compounds of the citronellol, and their products of decomposition. Proc. Br. Ph. Conf., 1874, p. 631.

*Volatile Oil of Olibanum* is, according to A. Kurbatow, separated into oliben,  $C_{10}O_{16}$  ( $O = 16$ ) and an oxygenated portion boiling at  $175^{\circ}$  C. ( $= 337^{\circ}$  F.). Oliben has an agreeable odor; sp. gr. 0.863, at  $12^{\circ}$  C. ( $= 53.6^{\circ}$  F.); boils between  $156^{\circ}$  and  $158^{\circ}$  C. ( $= 312.8^{\circ}$  and  $316.4^{\circ}$  F.), and yields with muriatic acid gas crystals of the composition  $C_{10}H_{16}HCl$  ( $O = 16$ ). A. J. Ph., February, 1875, p. 65.

*Oil of Orris*.—In view of the fact that the volatile oil of orris-root is becoming an article of commerce, Dr. Hager has subjected a sample of undoubted purity, prepared by Schimmel & Co., of Leipsic, to examination, and finds this commercial article to have the following properties: At the ordinary temperature it has the consistence and color of the basilicon

ointment of the German Pharmacopœia ; melts at  $38^{\circ}$  to  $40^{\circ}$  C. ( $= 100.4^{\circ}$  to  $104^{\circ}$  F.), forming a clear brownish-yellow liquid, which begins to congeal at  $28^{\circ}$  C. ( $= 82.4^{\circ}$  F.); it is soluble in 5 to 6 parts of 90 per cent. alcohol, forming a clear yellow solution at medium temperatures ; with 50 parts of 10 per cent. ammonia solution it forms, at about  $30^{\circ}$  C. ( $= 86^{\circ}$  F.), a whitish turbid mixture, which has the property of frothing ; 3 drops, heated to  $30^{\circ}$  C. ( $= 86^{\circ}$  F.) with 20 to 25 drops, forms a clear reddish-brown solution, which, allowed to stand ten minutes and mixed with 7 c.c. of 90 per cent. alcohol, forms a clear liquid, which is at first light violet in color, but gradually becomes deep violet. It is soluble in petroleum ether, forming a nearly clear solution. Applied to the skin it acts similarly to carbolic acid.

Owing to the small yield it will always command a very high price, and is therefore very apt to be adulterated. But the pure oil is, nevertheless, cheap, since 1 part dissolved in 3000 to 4000 parts of dilute alcohol produces an "Extrait de Violette," one drop of which will perfume a handkerchief for several days. Ph. Centralhalle, 1875, No. 19, p. 153.

*Oil of Eucalyptus globulus.*—The very exhaustive experiments of J. Homeyer prove this oil to be of the following composition: (1) A terpin, boiling at  $150^{\circ}$ – $151^{\circ}$  C. ( $= 302^{\circ}$ – $303.8^{\circ}$  F.); (2) a second terpin, boiling at about  $172^{\circ}$ – $175^{\circ}$  C. ( $= 342.6^{\circ}$ – $347^{\circ}$  F.); (3) of cymol ; (4) of an oxygenated body, which bears simple relation to cymol, and corresponds in its composition to the formula  $C_{10}H_{14}O$ , or  $C_{10}H_{16}O$  ( $O = 16$ ), probably the latter. The oil is mainly composed of the second terpin and cymol, which compose nine-tenths of the whole, and the relative proportions of these are about two of the terpin and one of the cymol. Arch. Ph., November, 1874, p. 393.

*Volatile Oil of Oreodaphne Californica.*—J. P. Heamy has subjected the oil of the "California Bay Laurel," which is contained to the amount of 4 per cent. in the leaves, but pervades all parts of the tree, to chemical examination, and has found it to be composed of a hydrocarbon and an oxygenated oil—*Oreodaphnol*.

*Crude oil* is limpid, of a straw color, has a pungent, aromatic odor, and a warm camphoraceous taste. It is soluble in 1000 parts of water, mixes in all proportions in alcohol and in ether, has a specific gravity of 0.936, and burns with a bright, smoky flame, leaving a carbonaceous residue. When inhaled it produces dizziness and headache, and is recommended for inhalation in nervous headache and nasal catarrh.

*Hydrocarbon*.—The pure hydrocarbon, obtained by fractional distillation, boils at  $175^{\circ}\text{C.}$  ( $= 337^{\circ}\text{F.}$ ), has a specific gravity of 0.894 at  $15.5^{\circ}\text{C.}$  ( $= 59.9^{\circ}\text{F.}$ ); is colorless and limpid; has an agreeable aromatic odor, bearing some resemblance to a mixture of camphor and oil of nutmegs, and a taste like that of cardamom; is highly inflammable, burning with a brilliant, slightly smoky flame; is nearly insoluble in water; soluble in five volumes of 95 per cent. alcohol, and dissolves iodine slowly, acquiring a deep red color. Nitric acid causes a violent reaction, and destroys its odor completely. Sulphuric acid and heating forms a thick red, finally, black mixture, and sulphurous acid is disengaged.

*Oreodaphnol*, the oxygenated portion was obtained between  $175^{\circ}\text{C.}$  ( $= 337^{\circ}\text{F.}$ ) and  $220^{\circ}\text{C.}$  ( $= 428^{\circ}\text{F.}$ ). It is oily in consistence, of a light straw color, of a pungent penetrating odor, and hot camphoraceous taste. Its specific gravity is 0.960, and it boils at  $210^{\circ}\text{C.}$  ( $= 410^{\circ}\text{F.}$ ). It burns readily with a bright flame, giving off pungent vapors and leaving a carbonaceous residue. Cold nitric acid reacts slowly; hot nitric acid violently. When distilled with glacial phosphoric acid, in an atmosphere of dry hydrogen, a light, straw-colored liquid is produced, which has a specific gravity of 0.934, boils at  $204^{\circ}\text{C.}$  ( $= 399.2^{\circ}\text{F.}$ ), burns with a white flame, and has no reaction with sodium. The author has named this liquid *Oreodaphnene*. Am. Jour. Ph., March, 1875, pp. 195–109.

*Oil of Peumus boldus*, Morina (Oil of Boldo).—Claude Verne has obtained the volatile oil of boldo leaves, which seems to be composed of several oils having different boiling-points, but possessing the same odor as that of the plant. It has no reaction on litmus-paper, is very slightly soluble in water, but communicates to it its flavor and an acid reaction. It is



freely soluble in alcohol. Sulphuric acid colors it hyacinth red, nitric acid violet, potash red, and hydrochloric acid decolorizes it. The crude oil is strongly colored, but becomes clear yellow by rectification, by which its odor, which is strong, is also improved. It possesses a burning taste. Ph. Jour. Trans., Nov. 21st, 1874, p. 405.

*Oil of Cherry Laurel.*—Mr. Umney had submitted to Mr. W. A. Tilden a quantity of the essential oil of cherry laurel (about  $2\frac{1}{2}$  fluid ounces, the product of 300 pounds of the leaves, and consequently .05 per cent.), for examination. The essential oil had separated from the saturated water, from which, perhaps, as much more might have been obtained by fractional distillation. The oil was of a pale yellow color, and held in suspension a few crystals, probably consisting of benzoic acid. Its odor was characteristic of the leaf, together with that of bitter almonds; its sp. gr. 1.0615; the quantity of prussic acid was not determined, but was abundant—according to Umney less than 2 per cent. It consisted mainly of benzoic aldehyd, and contained, perhaps, 1 per cent. of a volatile oil, which is possibly benzoic alcohol, and a minute quantity of odorous resin. The author's inquiries as to the nature of the changes by which these bodies are produced in the leaf have not added materially to the general information on the subject. It seems to be agreed on all sides that the volatile oil does not prevail, but that it is formed by the action of water upon certain, at present unknown, principles. Hanbury (Pharmacographia, p. 227) states that "the leaves may be dried and powdered without the evolution of any odor of hydrocyanic acid, but the latter is at once developed by the addition of a little water." This seems to point out the direction of further experiments. Mr. Umney seems to lay emphasis on the opinion that the reaction between the principles producing the oil is *instantaneous*. Ph. Jour. Trans., March 27th, 1875, p. 761.

*Volatile Oil of Garden Cress* (*Lepidium sativum*).—H. Trommsdorff prepared the oil by distilling the fresh herb, immediately after flowering, with steam. The distillate did not separate any oil, which was obtained by agitation with



benzol, 73 kilograms of the herb yielding 84 grams. The oil was, by Prof. A. W. Hofmann, found to boil at  $226.5^{\circ}$  C. ( $-439.7^{\circ}$  F.), at which temperature three-fourths distilled over. This first portion contained a sulphur compound, the nature of which has not yet been ascertained; the remainder consists of the nitrite of phenylacetic acid, and is, therefore, identical with the oil of *Tropæolum majus* (see Proceedings, 1874, p. 222), which it closely resembles in its odor. A. J. Ph., Feb. 1875, p. 65; from Ber. d. d. Ch. Ges., 1874, p. 1293.

*Artificial Oil of Mustard.*—The production of artificial oil of mustard on an industrial scale has hitherto been unprofitable, on account of the difficulty of producing iodide of allyl (iodide of propylen), making it very expensive. But since Tollens and Henninger have succeeded in producing allyl alcohol by the action of oxalic acid on glycerin, the cheap production of iodide of allyl has become possible, and experiments recently made have overcome the difficulty experienced in the production of allyl alcohol on a large scale. The artificial product, which had, by Bertholet and Luck, been obtained by the action of sulphocyanide of potassium on iodide of allyl, is now brought into commerce by Heine & Co., of Leipzig, who claim that it cannot be distinguished from the natural product. It possesses the same chemical and physical properties, and its action upon the organism is absolutely identical with the volatile oil from mustard-seed. By Weith it is proved to be entirely free from isomeric sulphocyanogen compounds of allyl, the formation of which might be regarded as possible. Ph. Centralhalle, No. 21, 1875, p. 173.

#### ALCOHOLS, ALDEHYDES, ETHERS, ETC.

*Alcohol.*—The possible practical yield of alcohol from glucose, saccharine, and starch, is, according to S. Friedländer, generally estimated too low. Otto had estimated 70–80 per cent. as the average yield, and this is now very usually regarded as the limit. According to Pasteur's investigations, of 100 kilograms of glucose, 4.2 per cent. are converted into suc-

cinic acid and glycerin, about 0.3 per cent. into yeast, cellulose, and fat, the remainder, 95.5 per cent., being converted into alcohol. Upon this basis Friedländer calculates the following theoretical yields:

100 kilograms glucose yield 48.8 kilograms or 61.46 litres alcohol.

100 kilograms of saccharose (19 saccharose corresponding to 20 glucose) yield 64.69 litres of alcohol.

100 kilograms of starch yield 68.29 litres of alcohol.

The author concludes that 90 per cent. of the theoretical quantity is the highest that can practically be reached. Quantities corresponding to 84.4 and 86.25 per cent. of the theoretical quantities (on the above basis) have been obtained within the last few years. Ch. Centralbl., No. 41, 1874, p. 651.

*Absolute Alcohol* is obtained by J. Lawrence Smith in the following convenient and economical manner:  $1\frac{1}{2}$  litres of the strongest commercial alcohol (94 per cent.) are agitated occasionally for 8 or 10 days with 180 grams of the best quality of fresh-burnt lime, broken up into a coarse powder. At the end of that time two-thirds of the volume of the original alcohol may be drawn off, and, as it contains only the merest trace of lime, may be used as 98 per cent. alcohol, such being its strength, and representing the absolute alcohol of commerce, which varies between 98 and 99 per cent. To obtain the absolute alcohol, a litre of the 98 per cent. alcohol and 120 grams of coarse-powdered lime are introduced into a dry flask, an inverted Liebig's condenser is attached, and the mixture is digested for  $1\frac{1}{2}$  to 2 hours; after which the condenser is brought into its normal position, and the alcohol distilled. The magma, from which the 98 per cent. alcohol has been decanted, will yield, by distillation, the greater part of the alcohol contained in it, the product being a little stronger than 98 per cent. A. J. Ph., Jan. 1875, p. 33; from Am. Chem., Oct. 1874.

*An approximate estimation* of the strength of very small quantities of alcohol may, according to C. T. Barford, be made by moistening with it a small slip of filtering-paper

and applying fire. When, after the alcohol has been consumed, the paper slip catches fire readily, the alcohol must be stronger than 80 per cent.; if the paper barely catches fire, the strength may be presumed to be between 75 and 80 per cent.; if it does not catch fire at all, the alcohol cannot be stronger than 72–75 per cent. The rationale is this: The small percentage of water existing in strong alcohol vaporizes by the heat of the burning alcohol, and consequently leaves the paper dry; whereas with weaker alcohol than 73 per cent. the paper is left damp. Hans M. Wilder in A. J. Ph., Jan. 1875, p. 7.

*Alcoholic Fermentation of Solutions of Liquorice (Glycyrrhizin).*—It has been popularly supposed that liquorice was not infrequently used by brewers, but this supposition was met by scientific men with the assertion that the sweet principle of liquorice—glycyrrhizin—was not capable of undergoing fermentation, and hence could not be used by the brewer. The experiments of Griessmayer seem to contradict this latter assertion. He found that when glycyrrhizin, which, as is known, is a glucoside, was boiled for some time with water, the solution, which at first was quite frothy and subsequently lost this character, was capable of reducing alkaline solutions of copper. When subjected to the influence of yeast at a temperature of 87° F., carbonic acid was soon evolved, and when operating with 400 c.c. of solution, to which 0.5 grams of yeast had been added, fermentation was ended in three days. The presence of alcohol was proven both by distillation and by Liebig's test, and the fermented liquor was found to contain perfectly healthy *saccharomyces cerevisiæ*. Toward the end of the fermentation a very offensive odor was given off, to which may be due the vile taste and smell of certain beers. Ph. Jour. Trans., Dec. 19th, 1874, p. 486.

*Alcoholic Fermentation of Milk-sugar and of Milk.*—It is usually assumed in text-books that milk-sugar, under certain conditions, will slowly and with difficulty undergo alcoholic fermentation. E. Reichardt has by his late experiments proved that solutions of milk-sugar will very readily undergo

alcoholic fermentation by the agency of ordinary brewer's yeast if a sufficient temperature is maintained. At  $30^{\circ}\text{C}$ . ( $= 86^{\circ}\text{F}$ .), the fermentation goes on regularly and rapidly, and is increased up to  $40^{\circ}\text{C}$ . ( $= 104^{\circ}\text{F}$ .); but over that temperature it soon ceases. Complete fermentation does, however, not seem to take place, as he has always found undecomposed milk-sugar in the liquids after fermentation had ceased. The author finds the fermentation to go on best and most regular in a solution containing 10 per cent. of milk-sugar. It seems also that a somewhat larger relative proportion of yeast is required than is necessary for ordinary saccharine solutions, although the proportion is still quite small. Arch. Ph., Sept. 1874, pp. 210-214.

*Analytical Method for the Detection of Bitter Principles, etc., in Beer.*—Several methods have been proposed during the past few years, and one of these was extracted in last year's report. The following method is proposed by Wittstein:

One litre of the suspected beer is evaporated at a moderate temperature to a syrupy consistence, the syrupy residue is agitated occasionally for twenty-four hours with five times its weight of alcohol of 93-95 per cent., the clear alcoholic liquid is decanted, the residue is again agitated with alcohol, the alcoholic liquids are filtered and evaporated, and contain all the bitter principles, to the exclusion of gum, dextrin, sulphates, phosphates, etc., which are of no consequence to the analysis.

(a.) A portion of the syrupy alcohol residue is tested for *picric acid* by diluting it with 3 parts of water and immersing a strip of white woollen goods for an hour. The presence of picric acid is proven if, after repeated washing, the strip remains yellow: a slight grayish tinge is of no consequence.

(b.) The remaining larger portion of the syrupy alcoholic residue is agitated twice for some time with 6 volumes of pure colorless benzin (benzol boiling at  $80^{\circ}\text{C}$ . [ $= 176^{\circ}\text{F}$ .]). The benzoic solution may contain *brucia*, *strychnia*, or *colocynthin*. It is evaporated to dryness, and the varnish-like residue tested as follows: A drop of nitric acid applied to a portion; it gives a red color = *brucia*. A drop of concentrated sulphuric acid; it gives a red color = *colocynthin*. A

few grains of bichromate of potassium, followed by a drop of sulphuric acid; it gives a purple-violet color = *strychnia*.

(c.) The syrupy residue remaining after treatment with benzol is heated, to drive off any traces of the latter, and is then agitated with amylic alcohol (pure, colorless, and of boiling-point  $132^{\circ}$  C. [=  $269.6^{\circ}$  F.]) twice successively as with benzol. It may contain *picrotoxin* or *aloes-bitter*. To determine which, a portion of the solution is allowed to evaporate spontaneously on a pane of glass. If fine white crystals are observable *picrotoxin* is present; in the contrary event *aloes-bitter* alone is present, which is characterized by a persistent saffron-like odor.

(d.) The syrup which remains after extraction with amylic alcohol, is freed from the latter by absorption with blotting-paper, and is then agitated with anhydrous ether. This takes up any *hop-bitter* remaining, and any *absinthiin* that may have been contained in the beer. The latter is recognized in the residue remaining after evaporating the ethereal solution by its odor, and by the action of concentrated sulphuric acid, which forms a red-yellow solution, which rapidly passes to indigo-blue.

(e.) The residue remaining after extraction by ether, being now free of hop-bitter, should no longer possess any bitterness. If bitter, it may contain *gentiopicrin*, *menyanthin*, or *quassiin*. To determine which of these is present, the syrup is heated to drive off adhering ether, dissolved in water, filtered, and a portion is tested with ammoniacal silver solution. If the solution remain clear, *quassiin* alone is present; if turbid, *gentiopicrin* or *menyanthin*. Another portion is evaporated to dryness, and a portion is tested with concentrated sulphuric acid; no color in the cold, but a carmine-red color when heated = *gentiopicrin*. A yellowish-brown color, gradually changing to violet, is produced = *menyanthin*. Arch. Pharm., January, 1875, pp. 25-33.

*Rectification of Alcoholic Liquids.*—The troublesome frothing occurring in some alcoholic residues from fluid extracts, such as sarsaparilla, etc., may be completely overcome, according to the observation of J. U. Lloyd, by rendering them acid

with sulphuric acid. Where a copper still is operated with, this will prove unobjectionable, as the acid mixture will not corrode copper. A. J. Ph., June, 1875, p. 247.

*Chloroform* being the exclusive production of manufacturers, Chr. Rump very justly concludes that it is within the province of the pharmacist only to determine the state of purity, and, eventually, to purify the commercial product. The author has therefore made some comprehensive studies of the characters of chloroform, and, as his experiments were made with large quantities, and seem to have been conducted with great care, his results are doubtless quite reliable. Operating on portions of 10 pounds at a time, he prepared altogether 122 pounds of chloroform. The observation that water passes over with the first portion of distillate, leads him to infer that it is dissolved in the chloroform in the gaseous state. He experienced great difficulty in removing the last traces of alcohol, hence resorted to washing with water and drying by chloride of calcium before distilling. The distillation, which proceeded regularly only when platinum fragments were introduced into the retort, commenced at  $57^{\circ}\text{C.}$  ( $= 134.6^{\circ}\text{F.}$ ); the contents commenced to boil at  $59^{\circ}\text{--}59.5^{\circ}\text{C.}$  ( $= 138.2^{\circ}\text{--}139.1^{\circ}\text{F.}$ ), and then gradually rose to  $60^{\circ}\text{C.}$  ( $= 140^{\circ}\text{F.}$ ), when the receiver was changed, all the water having passed over with the first distillate, and the further distillate only contains a contamination of alcohol. The distillation was discontinued as soon as the thermometer, which continued for some time at  $60.5^{\circ}\text{C.}$  ( $= 140.9^{\circ}\text{F.}$ ), had risen to  $60.75^{\circ}\text{C.}$  ( $= 141.35^{\circ}\text{F.}$ ), at which temperature heavy products of distillation commence to pass over. These the author found to be derived from the fusel oil originally contained in the alcohol from which the chloroform was made, and he states that all commercial chloroform is so contaminated. The distillate obtained between  $60^{\circ}$  and  $60.75^{\circ}\text{C.}$  ( $= 140^{\circ}$  and  $141.35^{\circ}\text{F.}$ ), had a sp. gr. of 1.419 at  $15^{\circ}\text{C.}$  ( $= 59^{\circ}\text{F.}$ ), and as it was free from alcohol, it contained some light products of distillation. By fractionally distilling the product he finally obtained a product which had a constant boiling-point at  $60.5^{\circ}\text{C.}$  ( $= 140.9^{\circ}\text{F.}$ ), in presence of platinum fragments, and a sp. gr.

of 1.500 at 15° C. (= 59° F.). Regarding the spontaneous decomposition of chloroform, the author finds that, as has already been shown by others, pure chloroform will keep undecomposed in a vacuum, even when exposed to direct sunlight, but is rapidly decomposed when in contact with air and exposed to sunlight. If it contains one-eighth per cent. of alcohol, sunlight does not decompose it before two weeks' exposure; it keeps better with one-fourth of alcohol, and is completely preserved against the effects of sunlight when it contains three-eighths per cent. of alcohol. One-eighth per cent. of alcohol reduces the third decimal in the specific gravity by two, consequently three-eighths per cent. of alcohol correspond to a sp. gr. of 1.494. The presence of moisture also facilitates the decomposition of chloroform, and it should, consequently, be filled only in carefully dried bottles. The author, furthermore, contradicts the assertions of some, and among them of Hager, that chlorine is not evolved among the products of decomposition by exposure to light. Both chlorine and hydrochloric acid are evolved under these circumstances. Arch. Ph., Oct. 1874, pp. 313–323.

In a subsequent paper the author draws attention to his observation that when chloroform is decomposed in the dark (in the black bottles in which it must be kept according to the German Pharmacopœia), which it is apt to do in the presence of moisture, *phosgen* is formed among the products of decomposition. He observes that he has never been able to detect this gas among the products of the decomposition of chloroform by direct sunlight, and therefore warns against the use of black bottles for its preservation, the direction of the German Pharmacopœia to the contrary notwithstanding. Ibid., pp. 323–326.

*Chloral Hydrate*.—In addition to its solubilities commonly given, Dr. Carl Jehn states that it is soluble in the fixed and volatile oils, a property which he has found nowhere stated. The author has also made experiments confirmatory of the peculiar color reaction, originally pointed out by him, of chloral hydrate on oil of peppermint (see Volatile Oils, in this report). Arch. Ph., Oct. 1874, p. 328.



*Chloral Hydrate.*—Tauret has noticed a peculiar decomposition of chloral hydrate. If to a mixture of solution of permanganate of potassium and chloral hydrate solution of potassa is added, evolution of gas immediately begins, the mixture becomes colorless, and deposits oxide of manganese. If but a few grams of chloral hydrate have been used, and the mixture has not been heated above 40° C. (— 104° F.), the reaction will be completed in the course of a few hours. The filtered solution contains chloride, carbonate, and formiate of potassium; the gas which escapes is carbonic oxide. Therefore, under these conditions, chloral hydrate is decomposed into carbonic oxide, carbonic acid, formic acid, and chlorine. It is not necessary that the solution of permanganate of potassium be very concentrated, and the mixture need not even be alkaline, since the reaction takes place equally well if borax is substituted for the alkali. The author concludes that a similar reaction may take place in the human organism, as the blood contains free oxygen, and reacts alkaline, and that, therefore, the hypnotic action of chloral hydrate may be due to the formation of carbonic oxide, and is consequently a poisonous action. Ph. Centralhalle, No. 46, 1874, p. 379.

*Chloral Hydrate.*—The rose coloration which takes place when chloral hydrate is shaken with oil of peppermint, which was pointed out by M. Carl Jehn (see Proceedings, 1874), has been the subject of experiment by A. Frebault in connection with his experiments on oil of peppermint (see Volatile Oils, in this report). The author has arrived at the conclusion that the color is produced in the oil of peppermint, and not in the chloral hydrate, and that it only occurs when the chloral hydrate used is acid, it being more intense in proportion as the chloral hydrate is more acid. But he has not yet been able to experiment with perfectly neutral specimens. In this case the reaction would be due to formic acid contained in the chloral hydrate, or possibly to hydrochloric acid resulting from partial decomposition. A. J. Ph., Aug. 1874, p. 367; Rép. de Ph.

*Solvent Power of Chloral Hydrate.*—According to Mr. R. F. Fairthorne, a solution consisting of 3 parts chloral hydrate



and 1 part of water is capable of dissolving 1 part of morphia in a portion of solution corresponding to 12 parts chloral hydrate, 1 part of veratria in a portion corresponding to 5 parts, and 1 part of atropia in a portion corresponding to 20 parts of chloral hydrate. These active principles should be in powder, mixed with the solvent in a test-tube, and heated by means of a water-bath, with occasional agitation, until solution is effected. The author proposes a number of glycerites, ointments, and lotions, based on the above observations, which will be found under "Pharmacy" in this report. A. J. Ph., Dec. 1874, p. 549.

*Chloralid*, which Städeler has described as a product formed during the preparation of anhydrous chloral, has been the subject of investigation by Personne, who finds it to have a constant boiling-point at  $275^{\circ}$  C. ( $= 527^{\circ}$  F.), and to melt below  $100^{\circ}$  C. ( $= 212^{\circ}$  F.). Its constitution must differ greatly from that of chloral hydrate, since with potassa chloride of potassium and but traces of chloroform are formed. Ph. Centralhalle, No. 36, 1874, p. 292.

*Perchlorated Ethylen*.—E. Bourgoin finds that the process of Geuther does not give satisfactory results, and recommends the following procedure as simple, easy, and successful: Dissolve by the aid of heat sesquichloride of carbon in double its weight of commercial anilin. Heat the mixture in a retort to  $170^{\circ}$  C. ( $= 338^{\circ}$  F.), and collect the product, which distils slowly into a receiver, which scarcely requires to be cooled. A quantity of 500 grams requires about six hours; the action commences immediately, and the liquid assumes rapidly a fine red color. The distillate is perchlorinated ethylen, holding in solution anilin and sesquichloride of carbon. The latter is removed by adding an equal weight of anilin, and distilling between  $130^{\circ}$  and  $145^{\circ}$  C. ( $= 266^{\circ}$  and  $293^{\circ}$  F.), and the anilin is easily removed from this second distillate by washing with dilute sulphuric acid. It only remains then to dry the product over fused chloride of calcium. Ch. News, May 14th, 1875, p. 217; from Compt. Rend., April 12th, 1875.

*Action of Bromine upon some Alcohols*.—Hardy, referring to

the results of Lœwig and of Schœffer, finds that the reaction is simplified and manifested more clearly when absolute alcohol and a suitable quantity of bromine are heated together in a sealed tube at a temperature of  $100^{\circ}\text{C}$ . ( $= 212^{\circ}\text{F}$ .) during several hours, the only precaution necessary being to drop the bromine into the alcohol in successive portions to prevent too great elevation of temperature. When the reaction has terminated, no gas is evolved upon opening the tube, and the liquid, perfectly decolorized, forms two layers, which may easily be separated. The upper layer contains hydrobromic acid and water; the lower layer contains bromide of ethyl and bromal, a portion of which is combined with alcohol, and consequently alcoholate of bromal, corresponding to the alcoholate of chloral.

*Propylic Alcohol*, treated in the same way, separates into two layers, the one consisting of aqueous hydrobromic acid, the other of hydrobromide of propyl and propyl-alcoholate of propyl-bromal. The latter is a slightly yellow liquid, having a composition corresponding to the formula  $\text{C}_3\text{H}_8\text{O}, \text{C}_3\text{H}_7\text{Br}, \text{O}$ . ( $\text{O} = 16$ ).

*Butylic Alcohol*, submitted to the action of bromine under the same conditions, gives a similar reaction, but the separation into two layers takes place after prolonged ebullition. The lower layer consists of aqueous hydrobromic acid; the upper of hydrobromide of butyl, butyl-alcoholate of butyl-bromal, and a non-volatile residue which carbonizes at a high temperature.

*Amylic Alcohol* yields likewise aqueous hydrobromic acid and a denser liquid. The latter consists of hydrobromide of amyl, and a liquid which separates on cooling after a portion of the ether has been distilled off. This liquid, mixed with sulphuric acid, was submitted to distillation under diminished pressure, and yielded a product which corresponded in composition to amyl-bromal, with two molecules of amylic alcohol. Ph. Jour. Trans., December 12th, 1874, p. 463; from Compt. Rend., vol. 79, p. 806.

*Action of Bromine upon Aldehyd.*—A. Pinner obtained by the action of bromine upon paraldehyd, dissolved in twice

its weight of glacial acetic acid and kept cool by being surrounded with water, bibromaldehyd and bromal, or tribromaldehyd. The bromine was allowed to flow into the solution of aldehyd very slowly. At first it dissolves and colors it pale yellow, but gradually the temperature rises, and the liquid becomes deeper colored. The reaction does not cease until three equivalents of bromine have been added. Ch. News, March 19th, 1875, p. 130; from Ber. Chem. Ges., No. 16, 1874.

*Nitrous and Nitric Ether.*—A method for the production of various ethers has recently been advocated by Champion, in which the corresponding ether-sulphuric acid is made use of. Thus, for instance, *nitrous* ether is made, according to the author, by slowly introducing ethyl-sulphuric acid into a mixture of two parts of concentrated sulphuric acid and one part of nitric acid, the vessel being kept at the ordinary temperature of the air, when, in the course of half an hour, the liquid becomes cloudy, the nitrous ether rises, and may be decanted.

Dr. T. L. Phipson has experimented with this method, which, as applied to high atomic alcohols, is not precisely new, and finds that, as applied to ethylic alcohol, it is exceedingly dangerous. Having adhered closely to the author's proportions, he has invariably found that *nitric* ether is readily formed, not in the course of half an hour, but in the space of a few minutes; and that, however slowly the sulphovinic acid is introduced into the mixture of sulphuric and nitric acids, surrounded by cold water; and, however quiet the reaction appears, there comes a moment when, without the slightest apparent cause, the whole decomposes with the production of great heat and volumes of nitrous vapors, the liquid frothing up to twelve or fourteen times its original volume. So intense is the reaction that, if the operation were conducted with large quantities of material in the hands of the manufacturer, it would probably have very serious consequences. Ch. News, February 19th, 1875, p. 75.

*Sulphovinate of Sodium.*—The following easy and practical process for its preparation is recommended by Dubois (Jour.

de Ph. d'Anvers, June, 1874): Equal volumes of alcohol and sulphuric acid are heated together in a flask, the product being a mixture of sulphuric and sulphovinic acids. Concentrated solution of caustic soda in alcohol is then added little by little, the temperature being kept down by a freezing mixture, otherwise some of the sulphovinic acid would be split up into ether and sulphuric acid. The sulphate of sodium formed, separates from the solution; is removed by filtration; the filtrate is distilled to recover alcohol; the residue is evaporated on a water-bath, and, when a pellicle forms, is allowed to crystallize. Very white crystals of sulphovinate of sodium, free from sulphate, are formed. Ch. and Drug., August 15th, 1874.

*Methylic Alcohol.*—G. Krell finds that the conversion of wood spirit into iodide of methyl is the best means of determining its percentage in the commercial article. Into a glass flask, of about 100 grams capacity, 30 grams of dry biniodide of phosphorus are put, and the flask is then closed with a stopper, which is preferably of glass, and is perforated with two holes. One of the apertures contains a pipette, holding about 5 c.c., and the other supports a tube bent at an obtuse angle. The latter is fitted with a good cooling apparatus, and serves first as a cohobator and afterwards as a condenser, the flask being gently inclined. The pipette is filled with exactly 5 c.c. of the wood-spirit in question, at 15° C. (— 59° F.), which is allowed to flow down on the iodide of phosphorus at the rate of 10 drops a minute. When all has been thus added, the flask is heated for five minutes with boiling-water, during which the cooling apparatus serves as a cohobator. The flask is then inclined so that the distillate may pass off and be distilled on a water-bath as long as anything passes over; the flask being towards the end of the process entirely submerged in the boiling-water. The distillate is collected in a receiver, consisting of a narrow graduated tube, accurately graduated to 25 c.c., which, when the distillation is ended, is filled up with water and the rinsings out of the tube to the mark 25 c.c. The iodide of methyl is then shaken up with the water and its volume read off at a temperature of 15° C. (— 59° F).

5 c.c. of pure methylic alcohol yield 7.19 c.c. of iodide of methyl. Ch. News, January, 1874; from Ber. d. D. Ch. Ges.

A. Riche and C. Bardy propose a method for the detection of methylic alcohol in admixture with ethylic alcohol, which is based upon the difference in shade and stability of the colored products which ethyl-anilina and methyl-anilina yield by limited oxidation. 10 c.c. of the alcohol, 15 grams of iodine, and 2 grams of red phosphorus are distilled together, in a small flask, the product being collected in 30 to 40 c.c. of water. The alcoholic iodides are separated by means of a separating funnel and collected in a flask containing 6 c.c. of anilina. The mixture grows hot, and the reaction is assisted by warm water, or moderated by cold water if ebullition sets in. After a lapse of an hour, very hot water is poured into the flask to dissolve the crystals formed, and the liquid is boiled until it is clear. The anilina compounds are then separated by the addition of an alkaline solution, and the oily fluid alkaloid is raised up into the neck of the flask by sufficient water and removed. The oxidation of the alkaloids is best effected by allowing 1 c.c. to flow upon 10 grams of "Hoffmann's mixture" (100 parts quartz-sand, 2 parts chloride of sodium, 3 parts nitrate of copper), contained in a test-tube of two centimeters diameter, and, after thorough mixing with a glass rod, it is heated to  $90^{\circ}\text{C.}$  ( $= 194^{\circ}\text{F.}$ ) for eight or ten hours in a water-bath. The matter is then exhausted thrice, with lukewarm alcohol, and brought to the volume of 100 c.c.

Pure alcohol, so treated, produces a liquid of a reddish-wood shade; if it contains 1 per cent. of methylic alcohol it appears distinctly violet when compared with the former; with 2.5 per cent. the violet is very decided, and becomes more intense as the percentage of methylic alcohol is larger. The product from pure ethylic alcohol does not affect bleached woollen tissues, whereas that from methylic alcohol dyes it violet.

Berthelot suggests, in this connection, a test for alcohol in presence of methylic alcohol. The process consists in mixing the suspected liquid with double its volume of concentrated sulphuric acid, under which conditions the methylic alcohol

yields gaseous methylic ether, which may be completely absorbed by water or concentrated sulphuric acid; whereas ethylic alcohol produces ethylen, a gas almost insoluble in water or concentrated sulphuric acid, but which may be recognized and determined by causing it to be absorbed in bromine. With the customary precautions in gaseous analysis, 1 to 2 per cent. of ethylic alcohol may be detected in wood-spirit. Aceton and the normal impurities of wood-spirit may yield, under these circumstances, carbonic acid and carbonic oxide, but not ethylen. Ch. News, May 28th, 1875, p. 238; Ibid., p. 238; from Compt. Rend., April 26th, 1875.

*Methylic Alcohol* may be obtained pure, most economically, according to E. Erlenmeyer, by first converting the methylic alcohol in the crude spirit into an oxalic ether, and then decomposing the ether by boiling it with water and distilling. The methyl-oxalic ether is readily obtained by dissolving dry oxalic acid in boiling methylic spirit and cooling the mixture. The crystals are drained upon a suction-filter, and washed with cold water until the washings no longer are capable of forming iodoform. N. Rep. Ph., No. 10, 1874, p. 624.

*Methylic Ether* is lately used to some extent for the artificial production of ice, and Erlenmeyer and Kriechbaumer have experimented with a view to determine an expedient process for its preparation on a large scale. The authors propose the following method as being the most economical, it yielding 57 to 70 per cent. of ether from the methylic alcohol used: 1.8 parts of methyl alcohol (commercially pure) is heated with 2 parts sulphuric acid in a retort, provided with a reverse condenser, to  $140^{\circ}\text{C.}$  ( $-284^{\circ}\text{F.}$ ). The gaseous product, which begins to be given off at  $110^{\circ}\text{C.}$  ( $-230^{\circ}\text{F.}$ ), is passed through solution of soda, to remove sulphurous acid, into sulphuric acid, cooled by being immersed in cold water, one volume of which absorbs 600 volumes of the methylic ether. In this condition the methylic ether may be kept for any period desired and may be transported in carboys. From this the ether may be liberated uniformly, by mixing it with an equal weight of water, and especially if a little heat is ap-

plied, 92 per cent. of the ether will be liberated. Ph. Central-halle, July 16th, 1874, p. 236.

*Salicylate of Methyl.*—Mr. John Williams has prepared some salicylate of methyl from the artificial salicylic acid of Kolbe, and finds it to be identical in its odor with oil of gaultheria. It is easily produced by mixing salicylic acid, pure methyl alcohol, and sulphuric acid together in a retort, and distilling in an oil-bath, the temperature required being about  $208^{\circ}$  C. ( $=408.4^{\circ}$  F.). The author infers that the artificial oil of gaultheria will shortly be produced at a much cheaper rate than the natural oil, and will find application for many of the purposes the latter is now applied to. Ph. Jour. Trans., February 6th, 1875, p. 624.

*Amylic Alcohol.*—Its detection in spirit of wine is effected by Ciro Betelli as follows: Dilute 5 c.c. of the suspected alcohol with 6 or 7 volumes of water. Add 15 to 20 drops of chloroform, shake strongly, and leave at rest. The chloroform is separated, and, on evaporation, leaves the amylic alcohol, which is readily recognized by its odor, reaction with sulphuric acid, etc. Ch. News, April 30th, 1875, p. 197; Gaz. Chim. Italiana.

*Nitrite of Amyl.*—According to Prof. A. Hilger, nitrite of amyl should be prepared by passing nitrous acid into chemically pure amylic alcohol at a temperature of  $70^{\circ}$  to  $90^{\circ}$  C. ( $=158^{\circ}$  to  $194^{\circ}$  F.), until the odor of amylic alcohol is no longer perceived. The product is rapidly agitated with magnesia or with dilute solution of potassa, is then dehydrated by, and finally rectified over, chloride of calcium, which must not be alkaline, only the portion distilling between  $90^{\circ}$  and  $95^{\circ}$  C. ( $=194^{\circ}$  and  $203^{\circ}$  F.) being collected.

So prepared it is free from acid reaction, has a pale yellow color, a peculiar characteristic odor, a boiling-point between  $94^{\circ}$  and  $95^{\circ}$  C. ( $=201.2^{\circ}$  and  $203^{\circ}$  F.), and a sp. gr. of 0.902 to 0.9026. Exposed to air it acquires an acid reaction, with formation of nitrous and nitric acid first, and then valerianic acid and valerianate of amyl. Amylic alcohol is also found among the products of decomposition, but hydrocyanic acid



could not be detected. The author suggests to preserve the ether by the addition of a little fused pure chloride of calcium and calcined magnesia.

E. Rennard likewise rejects the use of nitric acid in preparing this ether, and recommends the use of nitrous acid. He gives 0.877 as the specific gravity of amylic nitrite, which, however, according to Hilger, is not correct.

A. B. Tanner has already, as early as 1872, proposed the use of nitrous acid in preparing the nitrite of amyl, a circumstance of which Hilger was evidently not aware. A. J. Ph., Sept. 1874, p. 416; from Arch. Ph., 1874.

*Allyl Alcohol* has, by Aronheim, been found among the products of the destructive distillation of wood. The author ascribes the penetrating odor of crude wood-spirit to it. In its pure state allyl alcohol boils at  $97^{\circ}$  C. ( $-206.6^{\circ}$  F.). Ber. d. d. Chem. Ges., 1874, p. 1293; A. J. Ph., Feb. 1875.

*Colorless Crystallized Carbolic Acid*.—H. Schnitzler, who is engaged in the distillation of tar products, recommends the following method for its preparation, which is based upon the complete volatilization or carbonization of those substances that produce subsequent coloration: Turbid, black, so-called carbolate of sodium was heated in a copper retort, until the distillate became milky (15 kilograms for about ten hours). The distillate consisted of water, naphthalin, tar-oils, and carbolic acid. The residue in the retort contained the principal part of the carbolic acid in combination with soda, and formed, when cool, a solid mass. The maximum temperature of the atmosphere in the retort was  $170^{\circ}$  C. ( $-338^{\circ}$  F.); that of the liquid mass was not ascertained, but must have been much higher. The residual mass was dissolved in about three times the original volume of water, and allowed to stand a few days, when a muddy deposit had formed. The clear solution, which became turbid on addition of more water, was decomposed with dilute sulphuric acid, the separated carbolic acid subjected to distillation in a glass retort, and after the first aqueous portion had distilled over, the distillate was collected separately, only the last portions of which came over



somewhat colored (yellowish). Upon adding a crystal of carbolic acid to the distillate, it immediately assumed a crystalline condition, and formed a faintly moist mass, which was readily dried by a Bunsen's pump, the air being first drawn through loose cotton and chloride of calcium. In close vessels the perfectly dry crystals kept colorless for months, but when exposed to air in an open vessel, they acquired a violet-red tint, which the author ascribes to the influence of dusty particles. If the crude carbolate of sodium is not sufficiently heated, the product is yellow and disagreeably odorous. On a large scale iron instead of copper vessels will answer the purpose. Ch. Centralbl., No. 47, 1874, p. 744.

*Carbolic Acid.*—The statement of Jacquemin, that the blue color, produced by bringing anilina and hypochlorite of sodium in contact with carbolic acid, is due to carbolic acid, and upon which reaction he bases a method for the detection of the latter, is found by Meppen to be erroneous, the color being produced by the anilin. Arch. Ph., Oct. 1874, p. 359.

*Phenylcyanin.*—T. L. Phipson has obtained this new substance by adding to a solution of phenol in alcohol liquid ammonia, and allowing it to stand for some weeks in a partially closed flask. In about fifteen days the liquid had assumed a rather dark-green color, twice its volume of water and one-quarter its volume of ammonia was added, and the mixture left to itself for about six weeks. By this time the liquid had acquired a fine blue color, and a certain quantity of phenylcyanin had deposited on the bottom of the vessel, adhering strongly to the glass. That which remained in the liquid was precipitated by saturating it with salt. The product was purified by solution in alcohol (or benzol) and evaporation, and possessed the following properties: It is a very dark-blue, nearly black, resinous substance, showing a metallic copper-colored reflection, dissolves in alcohol with a fine deep blue, in ether with a reddish-blue, and in benzol with a reddish-purple color. It is readily soluble in sulphuric acid, forming a greenish-blue liquid; by hydrochloric acid is not much affected, and by nitric acid is changed into a nitrous

compound very different from picric acid. It is but sparingly soluble in water, but dissolves in hydrated alcohol containing ammonia, and this solution can be considerably diluted with water. Ch. News, June 20th, 1874, p. 299.

*Glycerin.*—The methods published for the examination of the purity of glycerin are somewhat tedious, for the glycerin must be tested not only with regard to its specific gravity, but also by means of all possible reagents for finding out impurities which might be present. In view of this Dr. Richard Godeffroy has devised a method by which some of the testing operations are very much simplified.

As is known pure glycerin should be free from color and smell, neutral, of specific gravity 1.26 to 1.27, capable of mixing with water and alcohol in all proportions, and free from all foreign substances. The proposed process is dependent upon the circumstances that when pure glycerin is heated to  $150^{\circ}\text{C.}$  ( $= 302^{\circ}\text{F.}$ ) it will commence to boil, can then be ignited, and will burn with a blue and not very luminous flame without diffusing the least smell, or leaving behind the least residue. If metallic salts be mixed with it they will remain as residue in the dish; the same would be the case when more highly organized combinations are present; these remain in the dish as a black, charred, or soot-like residue. When glycerin has a specific gravity below that of pure glycerin, it will boil under  $150^{\circ}\text{C.}$  ( $= 302^{\circ}\text{F.}$ ), but at the moment of boiling it cannot be ignited. The ordinary commercial glycerin of specific gravity 1.249 to 1.256 can easily be ignited by means of a cotton wick. Ph. Jour. Trans., Dec. 5th, 1874, p. 441.

The boiling-point of pure glycerin is considerably higher than that above given— $230^{\circ}$  to  $240^{\circ}\text{C.}$  ( $= 446^{\circ}$  to  $464^{\circ}\text{F.}$ ). Mr. Moss, in a discussion on the subject (*ibid.*, p. 455), draws attention to this fact, and suggests that Dr. Godeffroy intends to convey that at  $150^{\circ}\text{C.}$  ( $= 302^{\circ}\text{F.}$ ) a few gaseous bubbles escape. Prof. Attfield had repeated the experiment upon several samples of glycerin, and declared the method a ready one to be applied by any man who was not a chemist,

in order to ascertain whether glycerin was contaminated to any extent.

*Glycerin.* Preparation.—According to Casthelaz crude glycerin is purified by diluting it with water to 15° B., adding 1 to 3 per cent. of sulphate of aluminum dissolved in water, heated to boiling for half an hour, allowed to cool, and filtered. The filtrate is heated with 1 to 3 per cent. of carbonate of calcium, allowed to cool, filtered, if necessary, again through boneblack, and is then evaporated to 28° B. Tri-basic phosphate of calcium is said to be used to remove traces of lime. Ph. Centralhalle, No. 42, 1874, p. 347.

*Nitroglycerin*—Sergius Kern has found nitroglycerin to boil at 187° C. (— 368.6° F.), with evolution of orange vapors; at 220° C. (— 428° F.), to explode violently; at 262° C. (— 503.6° F.), to explode most violently; while at 294° C. (— 561.2° F.), it exploded very feebly, producing a yellowish flame. The nitroglycerin for the experiments was prepared in the ordinary way, only the apparatus was slightly altered. The glycerin was poured into a funnel, of five grams capacity, with a long tube and a tap near the neck. The mixture of fuming nitric and sulphuric acids was poured into a high glass surrounded with another filled with water. The funnel was introduced into the acid mixture (the tap open), the glycerin allowed to flow in, and quickly stirred by means of the funnel-tube. When the operation was finished, the mixture was poured into a large vessel filled with water; the nitroglycerin which had sunk was collected, and dried over sulphuric acid. It was nearly colorless, having but a faint yellow tinge, had a specific gravity of 1.6 at 15° C. (= 59° F.), and solidified, at 4° C. (— 24.8° F.), forming a crystalline mass. Chem. News, April 9th, 1875, p. 153.

#### FIXED OILS, FATS, ETC.

*Fixed Oils.*—Mr. J. J. Coleman has communicated to the chemical section of the Philosophical Society of Glasgow, a detailed account of the principal methods now in use for detecting adulterations in fixed oils. Jour. of App. Chem., Dec. 1874.

The principal tests employed are: 1. The heat produced by mixing 3 parts of the oil with 1 part of sulphuric acid; 2. The relative viscosity of each oil, as determined by the time required for a given quantity of each oil to flow from a pipette at a certain temperature and under certain conditions; 3. The spontaneous combustion which some oils undergo when cotton waste is saturated with them, at different temperatures, and the time required; 4. The determination of their drying properties by one or the other of three practical methods given; 5. The determination of their specific gravity; 6. The determination of the presence of mineral or resin oils. The author divides the oils into six classes, according to their commercial value, and gives the tests, that are in his judgment necessary, to discover adulterations.

Class I = sperm oil.

Class II = the oleins obtained by pressure from animal fats, known in commerce as tallow-olein, lard-olein, and neats-foot oil.

Class III = the olive oils.

Class IV = the rape oils.

Class V = the drying oils proper; represented by linseed oil.

Class VI = Fish oils. A. J. Ph., Feb. 1875, pp. 74-78.

*Purification of Oleic Acid.*—The paper contributed by Charles Rice on this subject, at the last annual meeting, will be read with interest. See Proceedings, 1874, p. 460.

*Oleate of Mercury.*—An extended series of experiments on the conditions that will yield satisfactory results in the preparation of oleate of mercury, leads A. Hilger to the following conclusions:

1. The oxide of mercury must be that which is prepared by the wet method, and which has been rapidly dried. This dissolves rapidly, whereas that made in the dry way is dissolved but slowly.

2. The temperature at which solution is best effected fluctuates between 60° and 70° C. (= 140° to 158° F.). A higher temperature causes decomposition of the oxide as well as of the oleic acid.

3. Oleate of mercury containing 15–16 per cent. of oxide forms a thick liquid substance of a yellow to red-brown color. When it contains more oxide it acquires the consistence of ointment; the maximum quantity of oxide which oleic acid is capable of dissolving, and only with the proper precaution, being 30 per cent. More oxide causes decomposition, separation of mercury, darker coloration, and, in short, the preparation is completely changed. Arch. Ph., June, 1874, p. 490.

*Stearic Acid.*—One of the most serious obstacles in its manufacture is the separation of oleic acid. It has been proposed to mix about 20 per cent. of bisulphid of carbon with the fatty mass before expression, which renders the oleic acid more fluid, and permits its removal by cold expression. Heeren draws attention to the loss of bisulphide of carbon, owing to its extreme volatility, and to the inconvenience resulting by its use to the operators. He proposes as a substitute petroleum benzin, which he thinks will serve the purpose as well, and is not subject to the same objections. Ch. Centralbl., No. 31, p. 488, 1874.

*Soap.*—Mr. A. Senier, Jr., gives a process for the analysis of soap, which, in part, is based on the process of Moffit. The process comprehends the determination: 1, of alkali, combined and free; 2, of the fatty acids and their fusing-point; 3, of the glycerin; 4, of carbonates; 5, of the resin; 6, of the salts and coloring matter; and 7, of the water. The process is given in concise language, and will be perused with advantage by those interested in the subject. A. J. Ph., Aug. 1874, pp. 353–355.

*Castor Oil.*—By the action of heat upon ricinoleate of sodium, obtained by testing castor-oil with an equal weight of caustic soda, Mr. E. Neison obtained sebate of sodium. The sebacic acid may be separated from this by two methods detailed by the author. It forms feathery crystals or brilliant laminae, soluble in 1500 parts of water at 10° C. (= 50° F.), and in 22 parts at a boiling heat; it is readily soluble in alcohol and in ether. It forms two classes of salts, of which the neutral appear to be the most stable. Many of these salts

were prepared and analyzed by the author. Ch. News, Jan. 31st, 1874, p. 45.

*Castor-oil Soap*, which has been recommended as a substitute for castile soap in the preparation of soap liniment (see Proceedings, 1873), is strongly recommended for that purpose by C. Heylmann, who recommends the following specific directions for its preparation: First form a potash soap, by heating a solution of 1 part of potassa in 6 parts of water with 5 parts of castor oil, stirring until a perfectly transparent, *not milky*, solution is formed; add to this, with constant stirring, a saturated solution of  $1\frac{1}{2}$  parts of chloride of sodium, and, when cool, allow the precipitated soap—now changed to a soda soap—to subside for a day. The soap, after removal from the solution of chloride of potassium and surplus of uncombined alkali, is cut into pieces of suitable size and laid aside to dry. The Pharm., Feb. 1875, p. 35.

*Olive Oil*.—According to the observations of L. Moschini, pure olive oil may be in a condition in which the usual tests would indicate impurity or substitution. If pure olive oil is exposed to the rays of the sun, it becomes completely decolorized during the course of a month, and while it will still be in a condition to become solid by the action of nitric fumes, and retains its specific gravity unchanged, it will, when exposed for three months, fail to solidify, even when exposed to nitrate of mercury. Olive oil, so decolorized, does not become green on the addition of sulphuric acid, but assumes a red-yellow color. It also possesses acid reaction and is capable of dissolving anilin red. Hence Jacobsen's test for free acid in adulterated olive oil is not available in all instances. Arch. Pharm., January, 1875, p. 84.

#### LIGNINS, STARCHES, SUGARS, ETC.

*Gun-cotton*.—According to R. Böttger, when well-made gun-cotton is boiled for ten minutes with a concentrated solution of stannite of sodium, there is formed a clear yellowish solution, which may be diluted with water without becoming turbid. Upon the addition of hydrochloric acid, regenerated

cellulose is precipitated. As cellulose is insoluble in stannite of sodium, the above reaction may serve for the detection of unconverted cotton in samples of gun-cotton. Chem. News, March 20th, 1874; from Bull. de la Soc. Chim. de Paris.

*Starch, and the Starch-yielding Plants in the New World*, have been the subject of a comprehensive paper contributed by A. Ernst to Spanish journals, and extracted from the Spanish by Dr. H. Böhnke-Reich. In this very interesting paper the author reviews the characters of the various starches, which, identical in composition, differ chiefly in the size of the granules; their associations; their application and uses in domestic economy; their changes under certain conditions and associations; the etymology of the words "fecula," "amidon," and "amylum;" and he enumerates one hundred species of starch-yielding plants occurring in the New World (North and South America), and used for the purpose of preparing starch or flour, or which serve as a nutriment. The word *amylum* is derived from the Greek *α-μυλος*, "not prepared with the mill-stone," "*amylum dictum est eo quod sine mola præparatur*" (Plinius and Dioscorides). *Amidon* is a mutilation of *amylum*. *Fecula* is derived from the Latin "fæx" (sediment). Arrowroot is a mutilation of the Guarani word *aru-aru*, signifying "flour-flour." *Sago* derives its name from the method of its preparation from various palms and cicadæ. A difference is sometimes made between the terms *fecula* and *amidon*; the first being applied to starch from roots, the latter to that from seeds. Arch. Ph., May, 1875, p. 418.

*Soluble Starch*.—Musculus had previously made known under the name of "*dextrine globulisée*" a body insoluble in cold water, which he obtained by dissolving starch in boiling acidulated water, and evaporating after saturation of the acid and filtration to the consistence of syrup. This deposits an abundance of granules, insoluble in cold water, and soluble only at 50° C. (= 122° F.), a property that allows of their being washed and separated from the dextrin and glucose by which they are accompanied; further treatment with alcohol will remove a little granulose (the matter, so called by Nægeli,



which can be removed from starch by water, which is colored blue by iodine, and which by some has been considered "soluble starch") still adhering, and there will be left what the author considers to be true soluble starch, the grains composing it being grains of starch deprived of their organization.

The author now enumerates the properties of this product to substantiate his assertion. When dried in the air it is white and resembles starch. Freshly washed, it is insoluble in cold water, and does not reduce salts of copper; but, if it be left some time in contact with water, it dissolves perceptibly, and there is a little sugar formed. Its rotatory power is nearly quadruple that of dehydrated glucose. It dissolves entirely in water at  $50^{\circ}\text{C}$ . ( $=122^{\circ}\text{F}$ .), and is not precipitated upon cooling; by evaporation, however, a residue is obtained which has recovered its insolubility in cold water, and does not recover its solubility until heated to boiling, or, if allowed to digest for half an hour, at  $100^{\circ}\text{C}$ . ( $=212^{\circ}\text{F}$ .). It is precipitated from its solution by alcohol. When its solution is caused to congeal by cold, and the ice formed is allowed to melt, this starch is likewise precipitated. With iodine the color reactions of ordinary starch or of dextrin may be obtained at will. Thus, dilute solution takes a pure red color; when concentrated to saturation, a violet color; when iodine is added to a moderately diluted solution, so as to produce a deep brown color, and the solution is allowed to evaporate in the open air, it will gradually grow more and more purple, and eventually, when sufficiently concentrated, become of a magnificent pure blue color. The addition of a neutral salt having an affinity for water, such as chloride of calcium, will have the same result on the red liquid as concentration. The author enumerates other reactions and experiments made, among which the action of heat on the iodinated substance, the action of diastase, etc. *A. J. Ph.*, August, 1874, pp. 368-371; *Compt. Rend.*

*Dextrin.*—L. Bondonneau prepares dextrin free from glucose by dissolving the purest obtainable sample in water, filtering, decolorizing with bonechar, adding cupric chloride, followed by the addition of caustic soda sufficient to redissolve



the precipitate, boiling for half an hour, allowing the solution to cool, and filtering. The glucose is then entirely destroyed, and from the solution the dextrin may be precipitated, after the addition of a little hydrochloric acid, by alcohol. The precipitate is redissolved and reprecipitated, and is then pure dextrin. Pure dextrin, so obtained, is a white substance, easily soluble in cold water, and is colored dark red by iodine. The author concludes that Mulder's dextrins were really mixtures of dextrin with varying amounts of glucose. He also shows that a very small trace of acid brings about, at a high temperature, the conversion of a considerable amount of dextrin into glucose. A. J. Ph., June, 1875, p. 278; J. Chem. Soc., 1875; Dingl. Polyt. Jour.

*Gums and Mucilages.*—Mucilaginous bodies which swell up in water are, by Girard, who has made these principles the subject of comprehensive study, divided into three distinct groups. In the first of these is placed gum tragacanth, characterized by the presence of a body capable of giving rise to pectic compounds. To the second belong the mucilages not containing pectic principles, and characterized by the fact that even the weakest acids render them insoluble in water, such as the mucilage of quinces. The third class is free from pectic principles, and is not precipitated by dilute acids, but transformed rapidly, on the application of heat, into a matter comparable with dextrin, and into a saccharoid body. These bodies present the following properties in common: Under the influence of acids they are transformed by heat into a sugar, which crystallizes readily, is different from ordinary glucose, has greater reducing power than the latter, does not ferment, and belongs to the galactoses of Berthelot. The gummy principles of the last two groups differ from gum arabic in all their characters.

*Gum tragacanth* is sparingly soluble in water, and is far from yielding to that solvent, as is asserted, 30 to 50 per cent. of soluble gum, such soluble portion being a mixture of different bodies, and not a definite principle like arabin. If gum tragacanth is digested in a water-bath with 50 parts of water for twenty-four hours, it is transformed into a soluble gum,

having lost the property of swelling up after drying. This new matter is not arabin, but pectin. By the action of acidulated water (1 per cent.) on a water-bath, it is in about three hours so modified as to be totally soluble, and is converted into pectin, precipitable by alcohol. The amount of glucose (?!) formed during this reaction scarcely corresponds to a tenth part of the material employed. Hence the author thinks it probable that gum tragacanth contains more than half its weight of a pectic principle insoluble in water—probably identical with Fremy's pectose. Ch. News, April 2d, 1875, p. 150; Compt. Rend., Feb. 22d, 1875.

*Cane-sugar.*—E. Laborde finds that cane-sugar is capable of absorbing quite a large quantity of ammoniacal gas. If absolutely dry sugar is submitted to the action of a current of ammoniacal gas, dried over a long column of quicklime, the sugar becomes at first opalescent, and takes the waxy consistence described by Raspail, but in the course of twelve hours it liquefies, and flows on the surface of the tube; it then contains for 100 parts of sugar, about 7.83 of ammonia. On exposure to air the sugar loses the ammonia which it has absorbed, and at the end of three months retains only 0.37 per cent., but has still a very pungent flavor. Glucose, similarly treated, liquefies very rapidly, becomes colored, and forms a crystalline product. Ch. News, Feb. 27th, 1874; from Compt. Rend., Jan. 1874.

*Sugar.*—C. Scheibler has made some further experiments on the use of phosphoric acid to remove the lime from sugar solutions, and finds the method to possess many advantages. Along with the lime certain organic non-saccharine substances are precipitated; less molasses is formed; the sugar solutions will boil more readily, and are therefore capable of further concentration than is possible by the ordinary method; the product has a purer taste; the animal charcoal will reach farther, because it need not be expended in removing lime; and, finally, the inactive animal charcoal requires less muriatic acid to make it again active. The author gives an economical method for preparing phosphoric acid for this pur-

pose (see Phosphoric Acid, in this report). Ph. Centralhalle, May 14th, 1874.

*Sugar Manufacture.*—Eugene Perrot makes the statement, that when the scum of (beet-root ?) sugar manufactories is exposed to the air for some time, it gives rise to an orange-red vegetation, which has been classed among the algæ. This plant exercises the functions of a ferment, possessing the remarkable property of converting cane-sugar into mannite, acting, however, upon alkaline sugar solutions, while the acid juices resist the ferment. Sugar-juice, in the alkaline condition in which it is usually worked, when subjected to its influence, shows all signs of fermentation during eight or ten days, when, if evaporated gently over sulphuric acid, redissolved in alcohol, and again evaporated, crystals of mannite are deposited. Ch. News, Feb. 26th, 1875, p. 99.

*Crude Sugar.*—Scheibler determines the value of a sample of crude sugar by means of the following apparatus and process: The apparatus consists of two flat-bottomed flasks. The first is of 50 c.c. capacity, has a stopper cut sloping to admit of the circulation of air, and this is perforated with two holes, through which pass a short tube designed for the introduction of the exhaustion liquids, and a tube reaching to the bottom, and widened at its lower end, over which is stretched a piece of flannel to serve as a filter. This filter-tube is externally connected with the second flask by means of a caoutchouc tube. The latter flask, of 100 c.c. capacity, is fitted with a tube for connecting with the former flask, and another short tube to which a caoutchouc tube and a pinch-cock are fitted, this flask serving as an aspirator when a partial vacuum is made in it. A weighed quantity of sugar under examination is placed in the first flask, and is successively exhausted with the following liquids: 1. Alcohol at 85 per cent., containing 50 c.c. of acetic acid per litre, and saturated with pure sugar. 2. Alcohol at 92 per cent. 3. Alcohol at 96 per cent., both saturated with sugar, these exhausting liquids being kept in bottles over sugar-candy. Finally the sugar is washed with a few drops of absolute alcohol, is then dissolved in water, and

examined with the saccharimeter. Ch. News, Aug. 14th, 1874; from Bull. de la Soc. Chim. de Paris.

*Cane-sugar*.—W. L. Classen, by his experiments, confirms the disputed view of Maumené, the transmutation of sugar into inverted sugar at common temperatures, and without notable formation of mould. The author adds that it is not possible to determine glucose by the saccharimeter, as the errors of observation exceed the effect of the glucose produced. The determination can only be made by means of the cupropotassic tartrate, which other carbohydrates have also the power of reducing. Chem. News, 1874, p. 93; from Les Mondes.

*Alumina saccharata* is prepared, according to Jul. Athenstaedt, by dissolving moist, pure, hydrate of aluminum in liquor potassa, adding to the solution syrup, and passing carbonic acid into the mixture, to convert the caustic potassa into the carbonate. The solution remains clear, but on the addition of alcohol saccharate of aluminum is precipitated, is collected on a filter, washed with alcohol, and, if wanted in the dry state, is mixed with powdered sugar, or, if wanted in the liquid form, with syrup. Ph. Centralhalle, July 16th, 1874.

*Glucose*, according to E. Salkowski, seems to form a combination with copper, which, under certain conditions, is held with such force that it cannot be withdrawn without prolonged washing. Such is apt to be the result in testing diabetic urine if the sulphate of copper is added incautiously, the precipitate formed failing to redissolve, and the filtrate is colorless, feebly alkaline, and contains neither copper nor sugar. If one atom of glucose, five atoms of sulphate of copper, and ten atoms of hydrate of sodium are mixed, a precipitate is formed, which dissolves readily in soda-lye, while the filtrate contains no sugar. The solution in soda-lye, when heated, throws down all the copper as suboxide, but if the proportion (of copper?) has been exceeded, hydrated oxide of copper is mixed with the precipitate. Ch. News, June 11th, 1875, p. 261; from Mon. Scientifique, April, 1875.

*Glucose*.—An important precaution has become necessary

when applying Fehling's test to small quantities of glucose or non-crystallizable sugar, by the observation, made by E. Boivin and D. Loiseau, that Fehling's test-liquid added to pure distilled water, in the proportion of 1 c.c. to 50 c.c. of the latter, becomes, on boiling a few minutes, perfectly decolorized. If a small quantity of a calcareous salt is present, however, the decoloration does not take place. Ch. News, Jan. 5th, 1875, p. 9; Comp. Rend., Nov. 30th, 1874.

*Fehling's Glucose Reagent.*—Both Fehling's and Barresvil's solutions have the disadvantage that they very readily change their titre, and consequently give rise to error. In making such solutions the relation of alkali to tartrate of copper is of primary importance, since an excess of alkali has the power of changing crystallizable sugar, while if the alkali is deficient, the solution is decomposed by long boiling and suboxide of copper precipitated. By his experiments the author finds that a solution prepared as follows will keep perfectly, may be boiled for a long time either with or without pure cane-sugar (obtained by treating ordinary sugar with alcohol until all the glucose is removed), without depositing suboxide of copper, and it is not affected by diffused daylight:

10 grams neutral tartrate of copper; 400 grams pure hydrate of sodium; 500 grams distilled water.

The neutral tartrate of copper is obtained by precipitating a solution of sulphate of copper with neutral tartrate of potassium, washing the precipitate by decantation, and drying it at 100° C. (— 212° F.). Ph. Centralhalle, No. 21, 1875, p. 170.

*Maltose.*—E. Schulze's experiments confirm the results of O'Sullivan's experiments, according to which maltose differs from glucose, having the formula  $C_{12}H_{22}O_{11}$  ( $O=16$ ); reducing Fehling's test-solution in a smaller proportion than grape-sugar, 65 to 66 parts of which reduce as much suboxide of copper as 100 parts of maltose; and having a much greater rotatory power. Ch. News, Jan. 15th, 1875, p. 30; Ber. Chem. Gesel., Sept. 15th, 1874.

## ORGANIC ACIDS.

*Crystallized Formic Acid.*—The usual method of preparing the hydrated formic acid,  $C_2H_2O_4$ , consists in heating formate of lead in a tube, and passing dry sulphuretted hydrogen through it. In this manner the product always contains sulphur, and possesses a peculiar odor. By a slight modification of the process, Berthelot has avoided the formation of this contaminant, and obtained a perfectly pure product. The lead salt is completely dried, and the tube is heated in an oil-bath at a temperature not exceeding  $130^{\circ} C.$  ( $-266^{\circ} F.$ ) during the passage of the dry  $HS$ . The product is subjected to fractional distillation, and then exposed to a freezing mixture. The crystals so obtained melt at  $+8.6^{\circ} C.$  ( $-47.5^{\circ} F.$ ), which is a much higher melting-point than has hitherto been obtained. *Ph. Centralh.*, No. 10, 1875, p. 78.

*Concentrated Formic Acid.*—A highly concentrated formic acid (containing 94 per cent. of actual acid) may be obtained, according to Lorin, by introducing concentrated white (?) glycerin into a rather large tubulated retort, adding *dehydrated* oxalic acid, and then heating in a water-bath. The reaction commences at  $80^{\circ} C.$  ( $-176^{\circ} F.$ ), and is full at  $87^{\circ} C.$  ( $-188.6^{\circ} F.$ ). When the reaction slackens more oxalic acid is added. The product is absolutely free from allyl compounds. *Ch. News*, June 25th, 1875, p. 280; *Compt. Rend.*, May 31st, 1875.

*Acetic Acid.*—Hager and Mohr have had considerable controversy on the proper quantity of sulphuric acid that should be used in distilling acetic acid from acetate of sodium, Hager contending that two equivalents sulphuric acid is necessary, while Mohr maintains that one equivalent is sufficient (see *Proceedings*, 1878). B. Hirsch has taken up the subject, and has made a series of very comprehensive experiments, which are calculated to settle the dispute. These experiments were conducted with working quantities, and therefore under entirely different conditions to those of the experimental laboratory. The following is a summary of the author's results:

I. *Distillation, according to Mohr's method, with one equivalent sulphuric acid*; 6.5 kilograms of pure acetate of sodium used; 11 fractional portions of one-half litre each obtained, and each portion found to decolorize permanganate of potassium; yield, 80.22 per cent. of theoretical quantity; time, seventeen hours.

II. *Distillation with one and a half equivalents sulphuric acid and water*; same quantity and quality of acetate of sodium; sulphuric acid diluted with half its weight of water, and allowed to cool; 14 fractional portions of one-half litre each obtained; Nos. 1 to 8, and No. 14 decolorized permanganate of potassium solution rapidly, and Nos. 9 to 13 decolorized it much slower than the fractions of Experiment I; yield, 84.55 per cent. of the theoretical quantity; time, fourteen hours.

III. *Distillation, according to Ph. Bor. VII, with 1.71 equivalents sulphuric acid*; perfectly dry, and purified salt used (containing, however, traces of chloride of sodium); sulphuric acid, sp. gr. 1.835; two distillations made, in which the heat was applied more slowly in the second (III *b*) than in the first III *a*.

III *a*. Eight fractions of one-half litre each, the fractions Nos. 1 to 6 being nearly pure; yield, 88.4 per cent. of the theoretical quantity; time not given.

III *b*. Eight fractions of one-half litre each, all of them being nearly pure; yield, 96.8 per cent. of the theoretical quantity; time not given.

IV. *Distillation, according to III, with dilution of the sulphuric acid with half its weight of water*; materials and apparatus the same; 9 fractional portions, of which Nos. 1 to 7 were perfectly pure, but Nos. 8 to 9 required purification; yield, 99.19 per cent. of the theoretical quantity; distillation very regular; time not given.

V. *Distillation with one equivalent sulphuric acid diluted with half its weight of water*; the acid the same as in Experiments I and II; the salt pure and large, crystalline; 10 fractions collected, of which Nos. 1 to 8 were pure; No. 9 decolorized permanganate of potassium slowly, and No. 10 rapidly; yield,



99.84 per cent. of the theoretical quantity; time, fourteen hours.

From the above it appears that the use of one equivalent sulphuric acid is not only sufficient to decompose one equivalent of acetate of sodium, when operating on an industrial scale, but it also insures a larger and purer yield than when more sulphuric acid is used, and in this sense Mohr's position is maintained. In order to insure these good results it is necessary, however, that the sulphuric acid be diluted with one-half its weight of water, Mohr's opinion to the contrary notwithstanding. When operating in the quantities given by Mohr (120 grams salt to 45 grams acid), and distilling by the aid of an oil-bath, the author obtained 94.99 per cent. of the theoretical yield, but the conditions in this experiment vary very much from those in the manufacturer's laboratory, and cannot, therefore, serve as a comparison to his abovenamed experiments. Finally, the author recommends the following ingredients and proportions: 10 parts crystallized acetate of sodium, 4 parts sulphuric acid (3.9 parts = 1 equivalent), and 2 parts of water, with which the acid has been mixed and allowed to cool previous to beginning the operation. N. Rep. Ph., 1874, Nos. 11-12, pp. 700-727.

*Acetic Acid.*—A convenient method of separating acetic acid from other volatile acids—formic, propionic, butyric, etc.—is dependent upon the volatility of acetate of ammonium at the temperature of a water-bath. The distillate may be collected in aqueous phosphoric acid, and from this the acetic acid may then be separated by distillation. Ph. Centralhalle, No. 42, p. 348.

Hager has since applied the process practically on a mixture in which the acetic acid was associated with formic and carbolic acids. The distillate was rendered alkaline with caustic soda, evaporated to a small volume, introduced into a retort, an equivalent of sulphate of ammonium, and some ammonia-water added, and distilled on a water-bath, the body of the retort being immersed two-thirds in the water. The distillation proceeded easily, and was continued as long as drops formed at the mouth of the retort. The distillate contained,



besides acetate of ammonium and free ammonia, only traces of carbolic acid, and no formic acid. Ibid., No. 48, p. 397.

*Acetic Acid.*—C. Witz proposes methyl-anilin violet for determining the presence of mineral acids in vinegar, taking advantage of the property which this anilin compound has in turning greenish-blue in the presence of even the smallest quantities of free mineral acid; whereas acetic acid does not affect it in the slightest degree. The process is applied both qualitatively and quantitatively to the acid as well as its salts. Ch. News, April 16th, 1875, p. 173; from Bull. Soc. Chim. de Paris, Jan. 20th, 1875.

*Acetate of Ammonium*, in a perfectly pure and crystalline (needle-shaped) condition, is obtained, by Berthelot, by dissolving glacial acetic acid in ammonia, keeping the retort cool, and adding enough water to prevent the crystallization of the salt during the neutralization; the solution is evaporated in a current of dry, gaseous ammonia until the liquid solidifies on cooling. It is then introduced into a large capsule, and this is placed upon caustic lime, under a large bell-glass, into which a considerable quantity of ammonia gas is injected. After a few days the crystalline mass is broken, and the capsule again placed over lime in the bell-glass, containing an ammoniacal atmosphere. This has to be repeated several times, and it is then obtained in a condition resembling formiate of ammonium, does not possess acid reaction, and is extremely soluble in water. A. J. Ph., January, 1874; from Bull. Soc. Chim. de Paris, 1874, p. 440.

*Acetate of Lead.*—A practical method for the quantitative analysis of commercial acetates of lead has been devised by Fresenius, and is carried out as follows: A half litre flask is filled up to 500 c.c. with water; 1.3 c.c. more of water is then added, and an appropriate mark made. The object of increasing the measure to 501.3 c.c., is to make allowance for the sulphate of lead formed during the volumetric process, which amounts in volume to about 1.3 c.c., and thus to obtain accurately 500 c.c. of solution.

Ten grams of the acetate of lead under examination is then

dissolved in the flask with water, 60 c.c. of normal solution of sulphuric acid is added, the measure is brought to the mark corresponding to 501.3 c.c., the contents are thoroughly agitated, and the precipitate then allowed to settle.

(1.) Take 100 c.c. of the clear solution, titrate with chloride of barium, calculate the quantity of sulphuric acid indicated for the 500 c.c. of solution, deduct the result from the quantity of sulphuric acid used in the 60 c.c. of normal solution (= 2.4 grams), and calculate from the balance the equivalent quantity of oxide of lead. By multiplying by ten, the percentage of oxide of lead in the sample is obtained.

(2.) Take another portion of 100 c.c. of the clear solution, add a few drops of tincture of litmus, then add normal solution of soda until neutral, calculate for 500 c.c., deduct from the product the number of cubic centimetres of normal solution of soda corresponding to the excess of sulphuric acid found in (1), and calculate from the rest the acetic acid contained in the 10 grams of acetate of lead, and the percentage as before.

The process is rapid, easy of execution, and, as the author has experimentally proven, perfectly accurate. *Zeitschr. Anal. Ch.*, No. 1, 1874, pp. 30-37.

*Acetate of Lead.*—Mr. Henry Seward estimates the acetic acetate of lead as follows: A sample of the acetate of lead is dissolved in distilled water, litmus solution is added, and a moderate excess of standard solution of carbonate of sodium is measured in. The whole is then filtered, and the precipitate washed till the washings no longer affect litmus, the washings being collected separately and evaporated before adding to the filtrate. The filtrate is colored with a few drops more of litmus solution, if necessary, and exactly neutralized with standard solution of oxalic acid. As equal quantities of the standard solutions neutralize each other, the quantity of solution of carbonate of sodium actually required is ascertained by deducting from the quantity used the quantity of solution of oxalic acid required to neutralize the excess. From the data so obtained, the quantity of acetic acid is readily calculated. *Ch. News*, February, 1874, p. 66.

*Chlorobrom-aceton* forms, according to Theigarten, well-defined crystals of pungent odor, sparingly soluble in water, but readily in alcohol and in ether. It melts at  $34^{\circ}$  to  $35.5^{\circ}$  C. ( $= 93.2^{\circ}$  to  $95.9^{\circ}$  F.), and congeals again at  $24^{\circ}$  C. ( $= 75.2^{\circ}$  F.). Its boiling-point is  $177^{\circ}$  to  $180^{\circ}$  C. ( $= 350.6^{\circ}$  to  $356^{\circ}$  F.). Its formula is  $\text{CH}_2\text{BrCOCH}_2\text{Cl}$ . (O = 16). Chem. News, 1874; from Ber. d. D. Ch. Ges.

*Butyric Acid*.—The following is said to be the best method of preparing butyric acid on a large scale: Large tubs are placed in a room, in which the temperature is kept as constantly as possible between  $30^{\circ}$  and  $35^{\circ}$  R. ( $= 99.5^{\circ}$  and  $111^{\circ}$  F.). Into each tub are placed 110 parts glucose; 25 parts ground St. John's bread (*Silqua dulcis*); 50 parts prepared chalk, and sufficient water to fill the tub one-third full. After a short time fermentation sets in, and in a few weeks a consistent magma has formed. If fermentation sets in too slow, it may be incited by the addition of a little old cheese. The water, which evaporates, must be daily substituted by lukewarm water. After a few (with 100 pounds glucose 5–6) weeks the magma becomes thin, the formation of butyrate of calcium now begins, and it becomes necessary to add prepared chalk from time to time, in order to neutralize the acid formed. After four weeks more, during which an addition of about twenty parts of prepared chalk has been necessary, the sugar is completely decomposed, and butyrate of calcium, partly in solution and partly in a crystallized condition, has formed. The entire mass is carefully evaporated, and may then, by the well-known methods, be worked up for butyric acid, or may be directly used for making butyric ether; 100 pounds of glucose yielding 24 pounds of butyric ether. Ph. Centralhalle, No. 42, 1874, p. 364.

*Butyric Fermentation*.—According to P. Schützenberger, if the stems of *Elodea Canadensis*\* are left in a solution of sugar at a temperature of  $20^{\circ}$  to  $30^{\circ}$  C. ( $= 68^{\circ}$  to  $86^{\circ}$  F.) for a few hours, a part of the sugar is inverted, a mixture of

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\* *Anacharis Canadensis*, Planchon, Nat. ord. Hydrocharidaceæ. See Gray's Manual of Botany.

hydrogen and carbonic acid is given off, and butyric acid is formed in notable quantities. Chem. News, March 12th, 1875, p. 119.

*Valerianic Acid.*—According to Pierre and Puchot, the best method of preparing valerianic acid on a large scale is first to convert the amylic alcohol by oxidation into valerianate of oxide of amyl, and then to decompose the ether by means of concentrated solution of potassa. The following is the method proposed: To a mixture of  $3\frac{1}{2}$  kilos of water, 1 kilo of powdered bichromate of potassium, and 1 litre of purified amylic alcohol, a mixture of 1400 grams of sulphuric acid, and 800 grams of water is gradually added with continual stirring; the vessel being placed, during the mixing, in cold water and kept at a temperature of  $11^{\circ}$ – $12^{\circ}$  C. ( $= 51.8^{\circ}$ – $53.6^{\circ}$  F.). When all the acid mixture has been added the vessel is covered and allowed to stand twenty-four hours. The ethereal liquid floating on the surface, which is a mixture of 80 to 85 per cent. of the ether, with some valerianic acid, valerianic aldehyd, and undecomposed amylic alcohol, is decanted and subjected to distillation, that portion of distillate being collected separately, which passes between  $175^{\circ}$  and  $192^{\circ}$  C. ( $= 347^{\circ}$  and  $376.6^{\circ}$  F.). The ether, so purified, is then decomposed by allowing it to flow very gradually into a retort containing a concentrated solution of potassa (1000 parts ether = 400 parts potassa and 200 parts water), being careful not to add it too rapidly, as strong heating takes place, and may, by incautious addition, result in explosion. When all the ether has been added, the mixture in the retort is diluted with water, the regenerated amylic alcohol is distilled over with moderate heat, and the residue, valerianate of potassium, is used for valerianic acid in the usual way. The authors place the boiling-point of monohydrated valerianic acid at  $178^{\circ}$  C. ( $= 352.4^{\circ}$  F.), the barometer standing at 760<sup>mm</sup>, which is somewhat higher than is usually assumed. The chrome alum formed repays a considerable portion of the expense of the operation. Arch. Ph., June, 1874, p. 540; from Anal. de Chim. et de Phys.

Landerer has expressed his opinion to the effect that the

natural valerianic acid (from valerian root) is preferable to the artificial acid; basing this, apparently, on the difference of their odor, when compared side by side. Ed. Schär, in reply to this, observes, that while there is in all probability no difference, therapeutically or otherwise, between the two acids when pure, there doubtless is a difference of the two acids as ordinarily obtained. Valerianic acid from the root usually contains as impurity some of the constituents of the volatile oil, such as valerol, valeren (borneen), and valerian camphor. The presence of these accounts for a difference in the odor and boiling-point of the acids, but the author is not prepared to designate any difference in their medicinal action. Schweiz. Wochenschr., July 24th, 1874, p. 245.

*Crotonic Acid.*—C. Hell and E. Lauber propose the following simple method of its preparation: Pure monobromo-butyric-ethyl ether, boiling at  $170^{\circ}\text{C}$ . ( $= 338^{\circ}\text{F}$ .), is slowly dropped into a warm solution of freshly melted hydrate of potassium in absolute alcohol. The fluid becomes spontaneously heated to the boiling-point, while bromide of potassium is plentifully deposited. Carbonic acid is passed into the liquid until the reaction is very feebly alkaline. The portion soluble in alcohol is removed, freed from alcohol by distillation, the residue is mixed with dilute sulphuric acid, and the volatile acids are distilled over. The acid distillate neutralized with soda, is anew decomposed with dilute sulphuric acid, and finally agitated with ether. The residue remaining after the ether has been distilled off is distilled, and the portion passing between  $175^{\circ}$  and  $185^{\circ}\text{C}$ . ( $= 347^{\circ}$  and  $365^{\circ}\text{F}$ .), is repeatedly subjected to fractional distillation. Ch. News., Aug. 7th, 1874, p. 65; from Ber. d. D. Ch. Ges., 1874.

*Benzoic Acid.*—E. Salkowski has made some comparative researches upon the antiseptic action of benzoic and salicylic acids, and has determined "*that benzoic acid possesses more powerful antiseptic properties than does salicylic acid.*" This remarkable statement seems to be based on accurate and careful observations. See Ph. Centralhalle, No. 25, 1875, p. 213; from Berlin. Klin. Wochenschr., No. 22, May 31st, 1875.

*Benzoate of Lithium* is prepared by E. B. Shuttleworth as follows: An ounce, avoirdupois, of carbonate of lithium and nine ounces of water, are placed into a Wedgwood (porcelain) dish, gently heated by a spirit-lamp, and benzoic acid is gradually added, as long as effervescence is produced; about three and a quarter ounces being required. The solution (after filtering?) is evaporated to dryness, stirring constantly, and reducing the heat towards the close of the operation. The product is nearly three and a half ounces, and may be powdered for convenience. The salt so obtained is soluble in three and a half parts of water at 60° F., in two and a half parts at 212° F., and in 10 parts of cold alcohol, sp. gr. 0.838. Can. Ph. Jour., Feb. 1875, p. 229.

*Salicylic Acid*.—Kolbe and Lautemann had, in 1860, obtained salicylic acid artificially from phenol, by acting upon the latter with carbonic acid and metallic sodium. Having lately resumed the study of salicylic acid and its modifications, Kolbe endeavored to find a more economical source than oil of wintergreen, and naturally fell back upon phenol as such source. During the progress of his investigations, he found that the use of sodium (metallic) was not at all necessary, and that, to the contrary, he could obtain better results and yields by acting upon heated phenate of sodium with carbonic acid. The author, using a small iron retort, was able to prepare ten to twelve pounds of salicylic acid during about twelve hours. The phenate of sodium is obtained by saturating an equivalent of crystallized phenol, previously melted, with an equivalent of commercial soda-lye, and evaporating the solution to dusty dryness. If the product is not immediately used it must be kept in well-closed vessels, as it is quite hygroscopic, and in the moist condition yields much less salicylic acid. The so-obtained phenate of sodium, which is always more or less colored, is heated in an iron retort by means of an oil, metal, or air bath, gradually to 100° C. (— 212° F.). Carbonic acid (perfectly dry) is then passed into the retort, and the heat is gradually increased to 180° C. (— 356° F.). After a time phenol begins to distil over, and the temperature is then increased to 220° and finally to 250° C. (— 428°–482° F.).

When phenol no longer passes over, the process is ended. The residue in the retort is basic salicylate of sodium in an impure condition. The reactions producing these results are as follows: Two equivalents of phenate of sodium, by the action of heat, and in the presence of carbonic acid, are resolved into one equivalent of phenol, which distils over, and one equivalent of dibasic phenate of sodium, which, as fast as formed, takes up two equivalents of carbonic acid, and forms dibasic salicylate of sodium. The crude product, obtained as above, is dissolved in water, and muriatic acid is added, by which a magma of salicylic acid is formed. This is collected in a filter-bag, freed from the mother-liquors by strong pressure, and recrystallized. To obtain it entirely pure and white it is necessary to convert it into a methyl- or ethyl-compound, to decompose such compound with an alkali, and the salicylate so obtained with muriatic acid. The author has proved its identity with natural salicylic acid, both by its properties and by an ultimate analysis.

The author, furthermore, finds that the phenates of calcium and barium, will also yield salicylic acid when treated in the same manner as phenate of sodium; but they yield it in smaller quantity, probably because of their less stability. The most surprising result obtained, however, was with phenate of potassium, which yields *paraoxybenzoic acid* in place of salicylic acid.

The close relation of salicylic acid to carbolic acid (phenol) has induced the author to study its relation to fermentive action, and he has obtained results which justify him in deciding salicylic acid to be superior to carbolic acid as an antiseptic. It completely prevents or retards the reaction of emulsin in almonds, the formation of oil of black mustard, the fermentation of sugar solutions, the formation of fungi on beer, the spoiling of milk, wine, eggs, etc. J. Prakt. Ch., 1874, Nos. 11-12, pp. 89-112.

M. Knop, in the same journal (Nos. 17-18, pp. 350-355) affirms the antiseptic properties of salicylic acid also for the germination of seeds, the growth of young plants, the formation and growth of fungi, etc. The salicylic acid must, how-



ever, be in a free state; hence, its action ceases as soon as sufficient ammonia has been produced in the liquids, in which putrefactive change has not been completely arrested.

*Preparation of Pure White Salicylic Acid.*—The salicylic acid, prepared by Kolbe's method, has, at best, a deep yellowish tinge, but ordinarily is quite colored. To obtain it perfectly white it is necessary, according to Kolbe, to convert into an ether, and to decompose this by caustic soda, etc. This method, however, is open to many objections, and Dr. Aug. Rautert has found it extremely wasteful, owing to the decomposition of a portion of the salicylic acid at the high temperature necessary; only about one-fourth of the acid used being thus obtained in a perfectly pure condition. While salicylic acid cannot be sublimed under ordinary conditions, without undergoing decomposition, it may be volatilized in an atmosphere of gaseous or aqueous vapor far below its melting-point. It is volatilized with the aqueous vapor of its boiling solutions, and salicylic acid, which is exposed to a current of air heated to  $100^{\circ}\text{C.}$  ( $=212^{\circ}\text{F.}$ ), rapidly loses weight. Taking advantage of these properties, the author has devised the following apparatus and method, by which he succeeds in obtaining the salicylic acid perfectly white and pure, and in abundant quantities: The apparatus consists of a cylindrical copper vessel, which is surrounded by a jacket, provided with an aperture for the insertion of a thermometer, and which is filled with melted paraffin. The top of the vessel is provided with two openings; a smaller opening, through which steam is admitted, and a larger one, through which the vapors pass into a Liebig's condenser. The crude salicylic acid is introduced into the vessel through the larger opening, and, the connection having been made with the condenser, the paraffin is heated to  $170^{\circ}\text{C.}$  ( $=338^{\circ}\text{F.}$ ), and steam, superheated to the same temperature, is then passed in through the smaller tube. As soon as the acid reaches the temperature of the steam and paraffin it volatilizes; and that with such rapidity that the condensing-tube must be kept open by means of a wooden rod, which passing up the full length of the tube into the vessel is moved to and



fro; otherwise the tube will be stopped up in a few moments. The superheated steam is readily obtained of the required temperature by passing ordinary steam through a long coil of lead-pipe, contained in a paraffin-bath at  $170^{\circ}\text{C.}$  ( $-338^{\circ}\text{F.}$ ). Towards the end of the operation the temperature of both paraffin-baths is raised to  $185^{\circ}\text{C.}$  ( $-365^{\circ}\text{F.}$ ). Operating upon 1 kilogram of crude acid the process is ended in about two hours, and the still contains only a small amount of black, resinous residue, while the recipient contains pure white salicylic acid, which has a very faint odor of carbolic acid. From this it may be freed very readily by simple recrystallization from distilled water. Ph. Centralhalle, No. 20, 1875, p. 162.

*Salicylic Acid.*—The difficult solubility of salicylic acid is a source of great inconvenience when wanted for local applications, etc., on account of its antiseptic properties. Mathias Rozsnöay has experimented with a view to overcome this, and finds that for ordinary purposes a strong solution (1 in 50–100) may be obtained by the addition of three parts of phosphate of sodium; dissolving the acid and the phosphate by the aid of gentle heat. Such a solution is, however, too irritating in its character, to be used for open wounds, and the author recommends for such purposes a solution made by dissolving one part of salicylic acid and two parts sulphite of sodium in fifty parts of water. Such a solution does not irritate open wounds in the slightest degree, and possesses, in addition to the antiseptic properties of the salicylic acid, those of sulphite of sodium. Ph. Centralh., No. 13, 1875, p. 105.

*Salicylic Acid.*—Experiments made in the laboratory of Dr. R. Godeffroy, upon the antiseptic action of salicylic acid on various syrups, such as mulberry, almond, fennel, peppermint, etc., have given results confirmatory of those of Knop and other experimenters. Comparative experiments, made to determine the relative power of salicylic and carbolic acids as anti-ferments, lead the author to the following deductions:

One gram of salicylic acid is capable of preventing the fermentative action of

	18	grams of yeast entirely.
86	"	" in fourteen hours.
72	"	" in one hour.

One gram of carbolic acid is capable of preventing the fermentative action of

	5	grams of yeast entirely.
7	"	" in twelve hours.
10	"	" in one hour.

These figures seem to show that salicylic acid is more than three times as powerful as an anti-ferment, than is carbolic acid. Zeit. Oest. Apoth. Ver., April 20th, 1875; Ph. Jour. Trans., May 1st, 1875, p. 865.

*Salicylic acid* serves a useful purpose in preserving certain test solutions, such as solution of starch, saturated solution of bitartrate of potassium, etc., according to F. Mohr. Sulphate of quinia solution is also rendered stable by its addition without injury to its medicinal uses. Zeitschr. Anal. Chem., No. 1, 1875, p. 79.

Dr. E. R. Squibb, in a note read before the Medical Society of the State of New York, February 2d, 1875, reviews the history of salicylic acid, its properties, and its probable advantages as a medicinal agent. While the new antiseptic is efficient, as such, in many instances in which carbolic acid fails, it is, in any reasonable quantity, devoid of poisonous properties, and in the quantities necessary to arrest putrefactive change is absolutely harmless and tasteless.

*Lactic and Paralactic Acid.*—R. Maly has observed that lactic acid may be obtained in large quantities from the various sugars, saccharose, glucose, lactose, and also dextrin, if their solutions, at a temperature of 20° to 40° C. (— 78° to 104° F.), are subjected to the action of the mucous membrane of the hog's stomach. The acid is partly neutralized from time to time, care being observed not to neutralize it completely, and the formation of acid will go on regularly as long as sugar is

present. An abundance of lactic acid may thus be obtained. The ferment producing this action is an organized substance, resembling in its form, under the microscope, that which is formed during ordinary lactic fermentation. The author has likewise observed that, along with lactic acid, there is sometimes a small quantity of paralactic acid formed, but has failed to determine the precise conditions under which this formation takes place. The two lactic acids are distinguished by their zinc salts, which, of the ordinary lactic acid, is soluble in 58 to 63 parts water, while the paralactate requires but 16 to 17 parts. Ph. Centralh., No. 6, 1875, p. 42; Ber. d. Ch. Ges.

*Succinic Acid.*—Edme Bourgoin's experiments upon the solubility of succinic acid, prove very conclusively that the solubility, 1 part in 5 of water at ordinary temperatures, as usually given in text-books, is entirely incorrect. The source of the error the author has discovered in a paper on succinic and benzoic acid, by Lecanu and Serbat, which was published in 1823. The solubilities of succinic acid, as determined by the author, are as follows: 100 parts of water dissolving at 0° C. (— 32° F.), 2.88 parts; at 8.5° C. (— 47.3° F.), 4.22 parts; at 14.5° C. (— 58.1° F.), 5.14 parts; at 27° C. (— 80.6° F.), 8.44 parts; at 35.5° C. (— 95.9° F.), 12.29 parts; at 40.5° C. (— 104.9° F.), 15.37 parts; at 48° C. (— 118.4° F.), 20.28 parts; at 78° C. (— 172.4° F.), 60.77 parts; at 100° C. (— 212° F.), 120.86 parts of succinic acid. At ordinary temperatures 20 parts of water are therefore required to dissolve 1 part of succinic acid, and its solubility is very rapidly increased above 50° C. (— 122° F.). Arch. Pharm., Dec. 1874, p. 543; from J. de Ph. et de Chim.

*Malic Acid.*—F. A. Harsten applies the solubility of the lead salt of this acid in acetic acid to its separation from oxalic, citric, and tartaric acids, whose lead salts are not soluble in dilute acetic acid, at a temperature of 50° to 70° C. (— 122° to 158° F.), while malate of lead is dissolved in considerable quantities at that temperature, and again deposited in large amount on cooling slowly to 40° to 30° C. (— 104° to 86° F.), forming under these circumstances fine needle-shaped

crystals. This method is applicable both to its separation from other acids in extracts, and to its purification. Arch. Pharm., Feb. 1875, p. 110.

*Dioxymaleic Acid.*—This is, according to E. Bourgoin, formed by heating a dilute solution of bibromomaleic acid to  $160^{\circ}\text{C}$ . ( $= 320^{\circ}\text{F}$ .) for six hours in a close vessel. The acid is soluble in water, and in alcohol, but scarcely soluble in ether. Its alkaline and alkaline earthy salts are soluble in water. The existence of this acid completes a remarkable series. There are three acids, succinic, malic, and tartaric, to which correspond respectively maleic, oxymaleic, and dioxymaleic, containing two equivalents less of hydrogen. Ch. News, Dec. 11th, 1874, p. 274; Compt. Rend., Nov. 9th, 1874.

*Quantitative Determination of Tartaric and Citric Acids.*—In view of the fact, that the various text-books on quantitative analysis fail to give a method for the quantitative determination of these acids, E. Fleischer has, by his experiments, endeavored to fill this void in analytical chemistry, and recommends the following methods for their quantitative determination in various associations:

1. *In the free state or in combination with alkalies only.*—The solution is acidulated with acetic acid, and treated with sufficient acetate of potassium (in moderately concentrated solution) to convert the tartaric acid into bitartrate of potassium. The liquid is then diluted with twice its volume of 95 per cent. alcohol, and the cream of tartar is allowed to subside for one hour. The supernatant liquid is decanted, the residue washed with a mixture of 2 volumes alcohol and 1 volume water, and is then allowed to drain on a filter. It is then dissolved in hot water, the solution is colored with a few drops of tincture of litmus, and is titrated with one-half normal ammonia solution. One equivalent of alkali equals two equivalents tartaric acid.

The filtrate containing the citric acid is precipitated with solution of neutral acetate of lead, collected on a filter, washed with a mixture of equal volumes of alcohol and water, transferred into a beaker, and decomposed by sulphuretted hydro-

gen. The filtrate from the lead precipitate is boiled to drive off excess of HS, and the citric acid determined with one-half normal ammonia, as in the case of tartaric acid. While the citric acid is completely precipitable with acetate of lead from aqueous as well as from alcoholic solution, it is, nevertheless, of importance that the precipitate is not washed with water, but with diluted alcohol, as with water slow decomposition occurs.

The abovenamed course is also applicable to the *determination of the two acids in the presence of all metals which are precipitable by HS from their acid solutions*, provided there are no other bases besides alkalies, and no other acids besides acetic acid present. It is then only necessary first to remove the metals from the acid solutions by means of HS, and then to treat the filtrate in the manner above described.

2. *In the presence of other acids than acetic acid, and of such bases as are not precipitated in acetic solution by the acids present* (oxalic, sulphuric, muriatic, nitric acids; alkalies, magnesia, alumina, iron, zinc, etc.). The metals, precipitable from acid solution by HS, are first removed, the zinc after supersaturation with acetate of sodium, in which event, however (and in the absence of alumina and oxide of iron), the precipitation by HS is made from hot solution. The filtrate (cooled) is precipitated with excess of acetate of lead, citric, tartaric, oxalic, and sulphuric acid being precipitated completely, hydrochloric acid incompletely. The precipitate is washed on a filter with the previously mentioned alcohol mixture, is transferred to a beaker, and covered with caustic ammonia, which must be free from  $\text{CO}_2$ . The solution of tartrate and citrate of lead is filtered, the residue is washed with weak ammoniacal solution, sulphide of ammonium is added to the mixed filtrates, which are then acidified with acetic acid, and heated to boiling in order to drive off HS. The sulphide of lead is filtered off, washed, and the filtrate and washings treated with acetate of potassium, followed by two volumes of alcohol, the cream of tartar being collected, and the tartaric acid determined as before described. If no muriatic acid was associated with the two vegetable acids, the citric acid may be determined

at once in the manner before described. If present, however, it is best to proceed as follows: To the acid alcoholic filtrate, from which the tartaric acid has been removed, chloride of calcium is added, citrate of calcium not being deposited from acid alcoholic solution. If a precipitate is formed, it is owing to traces of sulphuric or oxalic acid, or both, which must be filtered off. Upon the addition of ammonia to the alcoholic filtrate, the citrate of calcium is then completely precipitated. The presence of alcohol, in proportion of at least one and a half volume of alcohol to one of water, is necessary to the precipitation, as citrate of ammonium in aqueous solution is not precipitated by chloride of calcium and ammonia in excess. The citrate of calcium is washed with alcohol, dissolved in acetic acid, and precipitated with acetate of lead, from which the citric acid is isolated and determined acidimetrically in the manner above recommended.

The above (2d) mentioned method is by the author regarded as the general method, as it may be applied, with slight modifications, to the most complicated associations of the two vegetable acids. The author gives however besides several special methods, such as their determination in the presence of lime and phosphoric acid, in fruit juices, and in difficultly soluble conditions, etc.; of these only their determination

3. *In their natural association in fruit juices* has been extracted, being specially important to the pharmaceutic student. The fruit juices containing often *malic acid*, and sometimes in preponderance over the other two acids, this is also to be considered in so far that it may not be mistaken for either of the others. The fruit juice, having been clarified by treatment with an equal volume of alcohol, filtration, and washing of the residue or filter with hot water, is precipitated with acetate of lead. The precipitate, containing besides tartaric and citric acids, malic, and perhaps also phosphoric, oxalic, and sulphuric acids, coloring and mucilaginous matter, is washed with aqueous alcohol, then treated with ammonia and filtered. The filtrate, colored more or less by the precipitated coloring matter of the juice, contains the tartaric, citric, and malic acids. Sulphide of ammonium and acetic

acid are then added, by which the solution often becomes nearly colorless. The precipitated sulphide of lead having been removed by filtration, the tartaric acid is removed by acetate of potassium and alcohol, and determined in the usual way. The filtrate now contains malic and citric acids. It is treated with chloride of calcium, ammonia, and a little alcohol. The precipitate formed contains all the citric acid and some malic acid. Upon washing it with boiling-hot lime-water, the citrate of calcium remains intact, while the malate is completely removed. The citrate of calcium is then treated in the manner before indicated, and the citric acid determined acidimetrically. Phosphoric, oxalic, and sulphuric acids, if present, remain in the lead precipitate, undissolved by ammonia, and may, if desired, be determined by the usual methods. Arch. Ph., August, 1874, pp. 97-109.

*Estimation of Tartaric Acid in Lees.*—R. Warington finds that the indirect methods of determining the potash, lime, and sulphuric acid, present in lees, and calculating the tartaric acid as bitartrate of potassium and neutral tartrate of calcium, are open to grave objections, since the sulphuric acid might exist either as calcium or potassium salt. He therefore recommends its determination direct as follows: A slight excess of oxalate of potassium is added, the mixture is neutralized with potash, and the oxalate of calcium is separated. The filtrate now contains all the tartaric acid as neutral tartrate of potassium, and is treated with excess of citric acid, which precipitates the tartaric acid as bitartrate of potassium. This is collected and weighed, correction being made for that remaining in solution. Ch. News, June 25th, 1875, p. 276.

*Metatartaric Acid*, which has been proposed as a substitute for citric acid in solution of citrate of magnesium, may be readily prepared by melting the ordinary tartaric acid in a porcelain-lined iron vessel on a sand-bath, stirring it a few times with a warmed glass rod, and dropping the clear liquid upon a perfectly dry glass plate, when, upon cooling, lozenge-shaped drops are formed, which must be kept in well-stoppered bottles. Ten parts of metatartaric acid, so prepared, correspond



to six parts of carbonate of magnesium. The saturation of the acid must take place at the ordinary temperature, as by heating the metatartrate is converted into the ordinary tartrate of magnesium, which separates in the form of a crystalline magma. Ph. Centralhalle, June 4th, 1874, p. 178.

*Metatartrate of Magnesium* in aqueous solution is, according to Hager, soon changed into the ordinary tartrate (in twenty-four hours). He therefore recommends it to be prepared and kept in the dry form. One hundred parts of metatartaric acid in four hundred parts of cold distilled water are saturated with an excess of carbonate of magnesium, the excess of the latter is filtered off, and the clear solution is mixed with twice its volume of 80 per cent. alcohol (not stronger). The amorphous salt is, after decanting the supernatant liquid, spread upon glass plates, divided by means of a wooden spatula in squares, and dried in a cool place; after which it is broken up into the square blocks, formed by the spatula, and kept in a cool place in well-stoppered glass vessels. So prepared it is readily pulverized; is soluble in four parts of water; is not hygroscopic, and possesses a mild and feebly bitter taste. Ph. Centralhalle, August 6th, 1874, p. 257.

*Citric Acid*.—According to Warington citric acid is now almost altogether prepared from the windfalls and imperfect fruit. The juice of such in its unconcentrated state contains 8 to 9 ounces of acid per gallon, whilst that expressed from imported fruit in England contains  $10\frac{1}{2}$  to  $12\frac{1}{2}$  ounces. There are usually about 64 ounces of free citric acid in a gallon of concentrated juice, and 6 or 7 ounces combined with bases; of the total acid about 8 per cent. is not citric acid. The author has found that citric acid, prepared in a certain manufactory, invariably contained one molecule of water, which it lost in the water-bath, but not always in vacuo over sulphuric acid; indeed, he had noticed in some instances, that it did not lose weight at all under the circumstances. The author, in his paper communicated to the Chemical Society (June 17th, 1875), details the methods of analysis employed for the estimation of free sulphuric acid, the total organic acids, and the actual citric acid in the concentrated liquor. It is a curious



fact that, although pure citric acid can be neutralized by chalk, concentrated lime-juice cannot. This seems to be owing to the phosphoric acid and iron present in the latter, as it was found to be impossible to neutralize a solution containing iron, citric acid, and phosphoric acid, even by protracted boiling with chalk. Ch. News, June 25th, 1875, p. 275.

*Oxalic Acid.*—The relative proportion of soda and potash required for the most profitable yield of oxalic acid from sawdust, has been the subject of experiments by W. Thorn, who finds that a mixture of 40 of soda and 60 of potash was practically equal to potash alone. It is an established fact, that soda alone will not answer the purpose, there being sometimes but mere traces of oxalic acid produced. The proportion of soda and potash, indicated above, affords the best yield when the material is in thin layers and care is taken to avoid fusion. The heating is done in shallow iron vessels, one part of sawdust (from pine wood) being stirred into a lye prepared from two parts of the mixed alkalies, and is conducted at a temperature of  $240^{\circ}$  to  $250^{\circ}$  C. ( $= 464^{\circ}$  to  $482^{\circ}$  F.). When the heating is completed the mass is boiled with water until entirely dissolved, and then concentrated to  $38^{\circ}$  B., when oxalate of sodium separates in fine crystals, which are freed from mother liquor by filter presses or centrifugals. The oxalate of sodium is, by means of hydrate of calcium, converted into oxalate of calcium, the caustic soda solution being reduced to  $40^{\circ}$  B. by evaporation and used in a subsequent operation, while the washed calcium salt is decomposed with a large excess of sulphuric acid, three equivalents to one of oxalate. The solution containing oxalic and sulphuric acids and a little calcium salt, is filtered from the sulphate of calcium, concentrated to  $15^{\circ}$  B. to allow the sulphate of calcium to crystallize out, and then to  $30^{\circ}$  B., from which on cooling oxalic acid crystallizes out, and is further purified by recrystallization. The yield from hard wood is smaller than from soft wood. Ch. News, May 15th, 1874; from Moniteur Scientifique, 1874.

*Oxalic Acid.*—When large quantities of pure oxalic acid

are required, Stolba recommends its purification by dissolving it in sufficient boiling hydrochloric acid, of 10 or 15 per cent., filtering, allowing the solution to cool, and washing the crystals with small quantities of water until the washings no longer indicate hydrochloric acid. Simple recrystallization from water secures a perfectly pure product, the only precaution to be observed being that its hot solutions, in both cases, be cooled rapidly, with constant stirring, thereby insuring small crystals, as large crystals may inclose some of the mother liquor. Oxalic acid purified in large quantities by this method, will volatilize completely if heated in a platinum crucible, without leaving the slightest residue. A. J. Ph., Sept. 1874, p. 437; from J. Appld. Chem., 1874.

*Oxalate of Calcium.*—Vesque has succeeded in obtaining artificially the peculiar and variable crystals of oxalate of calcium, the forms of which are for definite groups of plants, in whose cells they occur, as constant as they are characteristic. He obtained these by subjecting the constituents of oxalate of calcium to conditions similar to those to which they naturally would be subject in the plant, varying these conditions according to the form of crystals desired. For each modification of these conditions, the result is a constant and definite form of crystals, and among these there are many modifications which have already been observed in plants, while others have heretofore not been observed at all. Arch. Pharm, Dec. 1874, p. 544; J. de Ph. et de Chim., 1874.

*Santonin Acid.*—Heldt's saline compounds of this acid are, according to O. Hesse, true salts, the composition of the acid, which in the anhydrous state is known as santonin, being  $C_{15}H_{20}O_4$ . Santonic acid forms white rhombic crystals, which do not turn yellow on exposure to light, are sparingly soluble in cold water, and more readily in that solvent when hot, crystallizing from such solution on cooling. Chem. News, Jan. 1874; from Ber. d. d. Ch. Ges.

*Chrysamic Acid.*—Sommaruga and Egger have obtained chrysamic acid, from Socotrin aloes, in a state of purity, which, from the description generally given by experimenters,

has not hitherto been obtained. They obtained it in gold-glistening needles, which correspond in their composition to tetra-nitrodioxanthra-chinon. A description of the method of its preparation, its properties, products of decomposition, etc., is promised in a future paper. Ph. Centralhalle, No. 33, 1874, p. 266.

*Paraffinic Acid.*—When paraffin is treated with fuming nitric acid of 47° B., at a temperature not exceeding 110° C. (= 230° F.), a product of a buttery consistence is obtained, which, according to Pouchet, is composed of paraffinic acid associated with various volatile acids and their nitro-derivatives (see Paraffin). In order to purify the paraffinic acid, the raw product is saponified with four times its weight of caustic potassa, and boiled for twelve hours. A small quantity of undecomposed paraffin is thus separated, and an orange-red liquid formed. The soap is precipitated from its solution by common salt, washed with water, and treated in a retort with tartaric acid, by which the soap is decomposed, and the volatile acids distil over. The residue in the retort, which is dark-brown, is dissolved in ether, evaporated, and the product repeatedly crystallized from concentrated boiling alcohol. Instead of using ether, the residue may be reconverted into a potassa soap, precipitated by sulphuric acid, and then crystallized from boiling alcoholic solution until pure.

Pure paraffinic acid is a white or faint yellow solid somewhat lighter than water, and has an odor reminding of wax. It is insoluble in water, soluble in dilute alcohol, freely soluble in strong alcohol, ether, chloroform, benzol, petroleum, etc. Upon slow evaporation of its solution it may be obtained in pearly-glistening crystalline scales. Its solutions redden litmus; it melts between 45° and 47° C. (= 113° and 116.6° F.); when slightly heated and ignited it burns with a bright, smoky flame. Its composition is  $C_{43}H_{47}O_3,HO$ . With the alkalies it forms uncrystallizable deliquescent salts; with the alkaline earths yellowish-white curdy compounds. Its compounds with the metallic oxides are colored. Ph. Centralhalle, No. 47, 1874, p. 387.

*Tannin.*—A modification of the raw-hide method for the determination of tannin is proposed by Muntz and Ramspacher. A small piece of hide, softened in water, is stretched over a small drum of zinc, 0.06 metre in diameter, and secured by means of a copper wire. The opposite face of the drum terminates in a tube, to which can be adapted an india-rubber tube, 1.5 to 2.0 metres in length, and terminating in a funnel. Into this a known quantity of the extract of the sample is poured, so as to fill it, and after 4 or 5 c.c. have passed and are rejected, 25 c.c. of the filtrate are collected, and, simultaneously with the same quantity of the original liquid, evaporated to dryness at 100° C. (= 212° F.). The difference is tannin. Ch. News, Oct. 2d, 1874, p. 166; Compt. Rend., Aug. 10th, 1874.

*Gallic Acid.*—H. R. Proctor draws attention to the reaction of arseniate of sodium or potassium upon solutions of gallic acid, a mixture of the two, when exposed to the air, developing an intense green color. 0.05 milligram of gallic acid in 1 c.c. of water will produce a decided coloration. Dilute acids change the color to a clear purplish-red, and cautious neutralization with alkalis restores the green. Concentrated nitric and sulphuric, and boiling hydrochloric acids, change the color to pale yellow, which is not restored by ammonia, but, in the case of nitric acid, is changed to a deep orange-brown. Oxidizing agents mostly change the color to an orange-brown. Reducing agents destroy the color. When gallic acid is present in excess, a green solution is sometimes formed, which is not reddened by acids, but only turned purplish, and on standing deposits a bluish precipitate. The reaction seems peculiar to gallic acid. Ph. Jour. Trans., July 18th, 1874, p. 43.

Prof. Flückiger states that the reaction observed by the author is not due to the arsenic acid or the arseniate, but to the presence of a trifle of free alkali, a reaction which has long been known, and is recorded in Gmelin's "Organic Chemistry." It occurs with any alkali, caustic or not, provided it is present in very small quantity. Ibid., p. 88.

## ORGANIC BASES.

*Alkaloids.*—E. Schmidt has studied the reactions of sulphuretted hydrogen upon the various alkaloids. When this gas is passed into an alcoholic solution of *strychnia*, orange-yellow needle-shaped crystals are formed, which are identical with the compound  $C_{21}H_{22}N_2O_2H_2S_3$  ( $O = 16$ ), which Hofmann obtained by the action of yellow sulphide of ammonium. *Brucia*, *quinia*, *cinchonia*, and *morphia* produce analogous compounds, which can, however, not readily be obtained pure, being very easily decomposed. *Conia*, *nicotina*, and a number of other alkaloids, yield sulphuretted compounds, which have not yet been thoroughly examined. On the other hand *atropia*, *narcotina*, and *codeia*, do not seem to form sulphuretted compounds; handsome, well-formed crystals of sulphur separating from their alcoholic solutions, when sulphuretted hydrogen is passed through them. Pharm. Centralhalle, No. 46, 1874, p. 379.

A new reagent for the detection of alkaloids has been proposed by Yvon, the value of which seems, however, not yet to be established, and which, owing to its reaction with water, seems to require more delicate discrimination on the part of the operator than is consistent with usefulness. The reagent consists of a solution of iodide of bismuth and potassium, which, when added to a solution containing an alkaloid, and which has been acidulated with hydrochloric acid in the proportion of 4 drops to 40 to 50 c.c. of solution, produces a more or less deep orange-yellow precipitate. When the reagent is added to a solution containing no free or less acid than the above indicated quantity, or to water containing no acid, precipitation also occurs, but is due either entirely or in part, as the case may be, to the decomposition of the bismuth salt. The reagent is prepared by suspending 1.5 grams of subnitrate of bismuth in 20 grams of water, boiling, and adding 7.00 grams of iodide of potassium, and 20 drops of hydrochloric acid. A limpid orange-colored solution is formed. A. J. Ph., Aug. 1874, p. 374; Rep. de Ph.

*Preparation of Alkaloids and other Proximate Principles by the aid of Coal Oils.*—The high price of alcohol in France has made it desirable that some attempts should be made to prepare alkaloids without the intervention of that costly article. Boiraux, assisted by Léger, has made numerous experiments, and he has found that the oils obtained by the destructive distillation of coal are good solvents for many of the alkaloids, etc., and that they have the advantage over alcohol of having but little action upon the extractive, and giving at once nearly colorless solutions. The sudden death of Boiraux, just at the conclusion of his investigation, prevented him from publishing his results, which are, therefore, described by Léger from notes left by the deceased.

The author employed in his investigations coal oils in three different conditions:

1. The oils boiling between  $50^{\circ}$  and  $100^{\circ}$  C. ( $= 122^{\circ}$  and  $212^{\circ}$  F.), known in commerce as benzols;
2. That portion of the oil which passes over between  $80^{\circ}$  and  $120^{\circ}$  C. ( $= 176^{\circ}$  and  $248^{\circ}$  F.);
3. The preceding with the addition of 5 per cent. of carbolic acid.

According to the nature of the substance to be treated one or the other of these portions is employed. It is important also that the vegetable substances or precipitates be carefully dried before submitting them to the action of the oil, since coal oil cannot dissolve a substance already impregnated with water. Atropia, santonin, veratria, delphinia, strychnia, brucia, cantharidin, quinia, cinchonia, narcotina, and aconitia, were obtained by the author; and the editor of the *Répertoire de Pharmacie* states that the MSS. were accompanied by some remarkable specimens of the products of these processes. The details of these processes will be found in this report under the respective headings of the substance prepared. *Ph. Jour. Trans.*, Feb. 1875, p. 642.

*New Derivatives from the Opium Alkaloids.*—Mr. C. R. A. Wright communicated the results of his labors upon the derivatives obtainable from the opium alkaloids by various agents, his researches being in continuation of those commu-

nicated at previous meetings of the British Pharmaceutical Conference. His researches include the action of chloride of zinc on *codeia*, the relation of hydrochloric acid to *narceina*, and the action of acetic acid and its anhydrides on the alkaloids morphia and codeia. Proc. Br. Ph. Conf., 1874, p. 633.

*Morphia*.—The value of A. Husemann's sulphuric and nitric acid test has been questioned by F. Mohr in his recently published "Chemische Technologie." Husemann regrets that Mohr should have rendered the test questionable without first carrying it out himself, since, had he done so, he would have been convinced of its great value. The author maintains that when morphia or one of its salts is exposed to the action of concentrated sulphuric acid for twelve to fifteen hours at the ordinary temperature, or half an hour at 100° C. (= 212° F.), or for a very short time to 150° C. (= 302° F.), and to the cooled solution, in the event of having used heat, a drop of nitric acid, or a fragment of saltpetre, or chlorate of potassium, or a drop of chlorine-water, solution of hypochlorite of sodium, or chloride of iron is added, a magnificent blue to violet-red color is produced, which soon passes to dark-red. The reaction is not produced on the unchanged morphia, and hence, perhaps, Mohr's erroneous view, but upon the product of decomposition resulting by the action of concentrated sulphuric acid upon the morphia, and it becomes evident even with  $\frac{1}{100}$ th milligram of morphia. The author draws particular attention to the fact, that there exists no other substance, so far as within his knowledge, which will produce the same reaction only upon standing a certain time, or by the application of more or less heat to the sulphuric acid, and also, that chlorated oxidizing agents may in this reaction be perfectly well substituted for nitric acid. Arch. Pharm., March, 1875, p. 231.

Henry S. Wellcome says, that a solution of chlorinated soda and other alkaline solutions of chlorine, produce a color reaction which is available as a test for morphia. Chlorinated lime answering the same purpose, the author uses a solution obtained by adding 2 ounces of the fresh chlorinated compound to 1 pint of water, and, after standing a few hours, decanting



the clear solution. A drop of such a solution, added to morphia in powder, gives a deep red color. Added to a solution of 1 grain of morphia in 1000 grains of water, a bright-red color is produced, and on evaporating a drop of this mixture on a porcelain plate, a deep red ring remains. On the addition of ammonia or any other strong alkali, the solution becomes dark-brown. In a solution of 1 grain of morphia in 5000 grains of water, a distinct orange color is produced, and, with proper care, a reaction may be obtained in a solution of 1 grain in 10,000. Excess of chlorine decolorizes the solution, and the same results on the addition of excess of an acid, but in the latter instance the color is restored on the addition of alkali in excess. These reactions are not influenced by the presence of other alkalies.

The author has applied the test to a large collection of alkaloids, and finds that, with a single exception, none of them produce the same color reaction. The exception is *brucia*. Any solution of chlorine added to an acid solution of *brucia*, gives a bright-red color. An alkaline solution of chlorine does not react upon the powder (*brucia*?), but if a drop of an acid is first added, a deep-red color is produced. The color so produced is neither affected by strong acids or strong alkalies, although chlorine in excess will destroy it, and, as in the instance of morphia, the color cannot be reproduced.

Colchicia solutions are rendered but faintly yellow. Of the neutral proximate principles subjected to the test, phloridzin only behaves like morphia, but is distinguished by being, in powder, colored brown-black by strong nitric acid. Aloin gives a dark-red color, which, due to the alkali, is only partly destroyed by excess of acid. In testing morphia its solution should be neutral or slightly alkaline. A. J. Ph., July, 1874, pp. 305-307.

Upon the observation in Fresenius's qualitative analysis, that the salts of morphia are precipitated by the alkaline bicarbonates, Guhl bases a method of its isolation in toxicological analysis, and has succeeded in obtaining the morphia in a perfectly pure and crystalline condition, the product affording a specially handsome reaction with Hadler's test. The method



is as follows: The acid solution of the alkaloids is decolorized as much as possible with ether, the ether is completely removed, after decantation, by heating the solution, and this is then treated with bicarbonate of potassium to alkaline reaction, with avoidance, as far as possible, of strong evolution of carbonic acid. It is then heated to drive off carbonic acid completely, allowed to cool, and then again shaken with ether as long as any traces of residue remain on the evaporation of a portion of the ethereal washings. This treatment removes the alkaloids soluble in ether, and leaves the morphia intact. The aqueous residue containing the morphia is then brought on a filter, allowed to drain, the residue on the filter washed several times with cold water, and is then crystallized from boiling absolute alcohol. Perfectly white and well-formed crystals of morphia are thus obtained. N. Rep. Ph., No. 5, 1874, p. 309.

Herm. Weppen gives the following additional observations on Schneider's color-test for morphia (sugar and sulphuric acid): When 1 milligram morphia, mixed with sugar, is brought in contact with sulphuric acid, a wine-red color is produced, and remains at least one hour. If one-tenth milligram of morphia is used a distinct rose-red color is produced; with one one-hundredth milligram the color-reaction is not perceptible, but may be made decided by allowing a little bromine-water to flow on the mixture, the color being then as distinct as when one-tenth milligram is used without such addition. Schneider recommends that the morphia, previously mixed with sugar, be added to the sulphuric acid. This, according to Weppen's experience, is not absolutely necessary, although an advantage. Very distinct reactions may be obtained by mixing the sugar and morphia separately with the acid, and then mixing the two. The author is convinced that this color-reaction of morphia, especially with the additional aid of bromine-water, is as reliable as any of the reactions heretofore proposed, and that it possesses decided advantages over some. Arch. Ph., Aug. 1874, pp. 114-116.

*Hydriodate of Morphia*,  $C_{17}H_{19}NO_3, HI + 3H_2O$  (O = 16).—According to H. R. Bauer this compound is deposited after some

time from a solution of morphia in aqueous hydriodic acid, forming a white, silky-glistening salt, which is readily soluble in hot water, in ether, and in alcohol; with difficulty in chloroform. Winkler had obtained the salt in form of four-sided columnar crystals, but had operated by double decomposition between two parts acetate of morphia, and one part iodide of potassium. Pelletier's experiments seemed to indicate its solubility in cold water, which the author decides in the negative.

*Sesqui-iodide of Morphia* =  $2C_{17}H_{19}NO_3, 3I$ , is obtained by triturating together two parts morphia and one part iodine, dissolving the mass (completely) in alcohol and evaporating. A reddish-brown foliated crystalline mass remains, which is soluble in alcohol, ether, and chloroform; insoluble in water and cold acids, but soluble in the latter by heat.

*Tetra-iodide of Morphia* =  $C_{17}H_{19}NO_3, I_4$  (O = 16) obtained by mixing a salt of morphia with solution of iodine, dissolving the kermes-brown precipitate in alcohol, or, better, in solution of iodide of potassium, and evaporating. From the last-named solvent the salt separates in long, black, columnar crystals, which are soluble in alcohol, chloroform, benzol, and iodide of potassium solution; very sparingly in ether and bisulphide of carbon.

The author, furthermore, draws attention to the characteristic reducing power of the morphia salts on iodic acid. In 10,000 parts of water the reaction is quite evident by the aid of chloroform or bisulphide of carbon. Arch. Ph., Oct. 1874, pp. 303-305.

*A new alkaloid from morphia* has been obtained by G. Nadler by the action upon it of ammoniacal solutions of copper. It is distinguished from morphia by being precipitated in the amorphous state by ammonia, by its behavior with ferric chloride, ammoniacal solution of copper, potash, and strong sulphuric acid, and by the sparing solubility of its sulphate, and from apomorphia by the fact that in the moist state it does not become colored on exposure to the air, but remains perfectly unaltered. Its chlorine compound is dazzling white,

sparingly soluble in cold, but easily soluble in hot water, and insoluble in alcohol and ether. Ph. Jour. Trans., July 18th, 1874, p. 47.

*Amorphia*.—Macfarlane & Co.'s preparation has been experimented with by Oberlin, who finds it to have the following properties: It is in the form of a gray amorphous powder, is freely soluble in water, forming a gray solution, which gradually assumes a greenish tinge, and is sufficiently decomposed in twelve hours to have acquired a handsome green color, and is then without action when used hypodermically. When dissolved in syrup, and kept in well-stoppered bottles, the solution will retain its gray color for several weeks.\* Its alcoholic solution keeps unchanged for some time, but gradually changes, and forms finally an emerald green solution. It is not changed by ether, benzin, or chloroform, but the author fails to state whether it is dissolved by these fluids or not. Nitric acid produces a deep violet color, which remains unchanged for several hours. The red color produced upon morphia, as is well known, soon changes to yellow. Fröhde's test (1 milligram molybdate of sodium dissolved in 1 c.c. concentrated sulphuric acid) produces an intense green color, with a slight tinge of violet. Apomorphia changed in the air and dry assumes, under the same condition, a violet color. Perchloride of iron produces a rose-red color (morphia is blued); aqueous iodic acid (10 per cent.) produces a granite-red, an alcoholic solution of the same acid a pure red color. Zeitschr. Oest. Apoth. Ver., June 1st, 1875, p. 249; from J. de Ph. et de Chim., Feb. 1875.

*Codeia*.—Calmberg finds, contradictory to the Ph. Germ.,† that powdered codeia acquires a bright rose-red color when brought in contact with concentrated sulphuric acid, and that the color is changed, upon addition of a fragment of ferric

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\* The stability of the hydrochlorate in solution with syrup has already been noted by Hermann Blaser. (See Proceedings, 1873, p. 876.)

† (Ph. Germ., Amer. ed., p. 54. "With concentrated sulphuric acid they, the crystals, yield a colorless solution, which turns blue on the addition of very little solution of sesquichloride of iron."—REP.)

chloride, very gradually to violet. If liquor ferri sesquichlorati is used instead of the dry chloride, a dirty olive-green color is produced, which after several hours appears violet. Upon long standing, however, a bluish precipitate is formed, but the supernatant acid appears violet by transmitted light. An absolutely colorless solution of codeia in concentrated sulphuric acid cannot be obtained. Heating of the solution before the addition of the ferric chloride, seems to be necessary to produce the blue color described by the Pharmacopœia. Arch. Ph., January, 1875, p. 25.

*Narceina*.—Aug. Vogel states that if a little narceina, on a watch-glass, is moistened with chlorine-water, and ammonia then added while stirring, a deep blood-red color is produced, which does not disappear upon addition of excess of ammonia or heating. The reaction affords a suitable lecture experiment along with the characteristic reaction of tincture of iodine, which produces with narceina a blue color resembling that produced in starch solution. Ch. Centralbl., No. 35, 1874, p. 555.

C. F. Schulze has observed that narceina will dissolve readily in concentrated or moderately diluted sulphuric acid, but after a time the solution will, as if by magic, congeal to a crystalline magma. Arch. Pharm., Feb. 1875, p. 150.

*Alkaloids of Cinchona Barks*.—Dr. O. Hesse reviews the entire domain of the "cinchona alkaloids," and gives the results of his investigations, and his views in regard to their constitution, in a paper communicated to "Vierteljahrschrift für Praktische Pharmacie," vol. xxii, p. 366. The thoroughness with which the subject is treated is characteristic of the author, and makes the paper one of the most important contributions to our knowledge of the cinchonas. In the following abstract it is only endeavored to give a brief review of this valuable treatise, an excellent translation of which will be found in the Pharm. Jour. Trans., 1874, commencing January 17th, running through February and March, and ending April 4th. The formulas used are those of the new notation (O—16).

Preliminarily, the author draws attention to the fact that

one of the distinctions drawn by Weddell, between the genus *Cinchona* and the closely-allied genus *Buena*, cannot be uniformly relied upon, since he had found the "China cuprea," which in its physical structure differs considerably from the true cinchonas, to contain quinia and other alkaloids contained in the cinchona barks; while, on the other hand, Karsten had demonstrated, and the author had confirmed, that sometimes a true cinchona bark contains not a trace of alkaloid. He had also shown, by numerous experiments upon *C. lancifolia* and *C. corymbosa*, that the alkaloidal yield is probably not conditional upon the individual species of the plant, but that the soil and the climatic conditions upon which depend the nutrition and development of the plant call them into existence. These variations, however, extend not only to the relative quantities of each alkaloid, but, as has been shown in the *C. succirubra* cultivated in the East Indies, also to their entire nature. We may, therefore, expect to see the continued experiments made in different places upon the acclimatization of the cinchonas lead even to the production of new alkaloids.

*Quinia* forms with sulphuric acid three combinations:

1. *A neutral sulphate* (the commercial sulphate), which crystallizes from water with seven and a half equivalents of  $H_2O$ ; it is probable, however, that when it is entirely free from efflorescence, it would contain  $8H_2O$ . It crystallizes from alcohol with  $2H_2O$ .

2. *A sulphate containing one equivalent of acid* (the commercial bisulphate), which had already been obtained and analyzed by Baup. The numbers obtained by Baup do not agree with those obtained by the author, whose results correspond with the formula given by Gerhard, viz.,  $C_{20}H_{24}N_2O_2, H_2SO_4 + 7H_2O$ . Kraut's formula differs in giving  $7\frac{1}{2}H_2O$  instead of  $7H_2O$ . As obtained by the author, by dissolving sulphate of quinia in dilute sulphuric acid, it is in fine crystals, which become opaque at  $25^\circ$  to  $30^\circ$  C. ( $= 77^\circ$  to  $86^\circ$  F.), losing one molecule of water of crystallization, and at  $100^\circ$  to  $115^\circ$  C. ( $= 212^\circ$  to  $239^\circ$  F.) become anhydrous. The salt is soluble in eleven parts of water at  $13^\circ$  C. ( $= 54.4^\circ$  F.), as was found by Baup;

in absolute alcohol, on the contrary, it dissolves with considerable difficulty.

3. *A sulphate containing two equivalents of acid*, which is obtained by dissolving the preceding salt in an excess of moderately dilute sulphuric acid, and concentrating the solution over sulphuric acid. At a low temperature this compound is deposited in delicate white prisms, which may be easily purified by crystallizing them from a little hot water. Analysis proves it to have the formula  $C_{20}H_{24}N_2O_2 \cdot 2H_2SO_4 + 7H_2O$ . It is very soluble in cold water, more soluble in hot water, less soluble in alcohol, and quite insoluble in ether. Its aqueous solution shows very clearly the known fluorescence of quinia. Under the influence of light the crystals quickly assume a red-brown color.

Among the remaining salts of quinia the author only mentions the

*Hydrochlorate of quinia*, as he had previously, in "Annalen der Chemie und Pharmacie" (vol. cxxxv, p. 325), reported very fully upon them. A number of unfortunate accidents had occurred either through a substitution or an admixture of hydrochlorate of morphia. The two salts react very differently with dilute nitric acid (one of acid to four of water). Hydrochlorate of quinia, dissolved in the acid, has a scarcely perceptible tint, which does not change when the solution is exposed for some minutes to a temperature of  $50^\circ$  to  $60^\circ$  C. ( $= 122^\circ$  to  $140^\circ$  F.); but if the suspected salt contains morphia, the solution takes a coloration varying from yellow to orange-red. 5 per cent. of morphia gives the orange-red color; 1 per cent. a dark yellow; and even 0.2 per cent. produces a well-marked change in the color of the solution when heated.

The author's experiments upon the specific rotatory power of quinia and its sulphates are too comprehensive to find a place in this report. His experiments were made with a remarkably large Wild's polarimeter, and his objections, formerly expressed, as to the estimation of quinia by the polarimeter, have by them been entirely overcome.

Kerner's  $\gamma$  quinidia appears to be nothing else than crystal-

lized quinia, which the author found to be a hydrate, having the formula  $C_{20}H_{24}N_2O_2 + 3H_2O$ . The author has obtained these crystals with some difficulty, and finds them to form white, slender, shining prisms, becoming dull in dry air. They have not the pearly brilliancy that has been attributed to them by Duflos, and which are so characteristic of cinchonidia, and it seems therefore probable that Duflos had made his experiments upon quinia containing cinchonidia. Finally, the author draws attention to Reichardt's quinia, and that of many other chemists who have practiced the analysis of barks, which, being an extract obtained either by means of ether or of chloroform, may not contain any quinia at all, and therefore does not merit the name of quinia.

*Conchinia* is suggested by the author as a more proper name for the *quinidia* of Pasteur. It was first observed by Van Hejningen, during the examination of a specimen of chinoidin, who called it  $\beta$  quinia, and was of opinion that it was chinoidin in its purest form. It is found in considerable quantities in the bark of *C. pitayensis*, such as is brought from Popoyan; in the barks of *C. amygdafolia* and *C. ovata*; in that of *C. calisaya* from Java; and in many of the hitherto so-called East Indian Calisaya barks. The author finds the best method for separating it from a solution, containing at the same time considerable quantities of cinchonia, to precipitate by iodide of potassium, and separating the hydriodate of cinchonia by means of boiling water or alcohol, in which it is freely soluble, while the conchinia salt is not. De Vrij's method of separating it from chinoidin by conversion into tartrate (see Proceedings, 1873, p. 379) yields, in the author's experience, a mixture of cinchona alkaloids, from which, however, the conchinia is readily extracted. The optical properties of conchinia correspond with those given by Pasteur for his *quinidia* in some respects, but differ again in others, probably because Pasteur, in estimating the rotatory power of sulphate of conchinia (*quinidia*), did not use pure alcohol for his solution, but a moderately dilute acid. The rotatory power of conchinia is scarcely modified when it is brought to the state of neutral sulphate, but this is greatly augmented when it is



brought into the state of sulphate with one molecule of acid; it then remains nearly constant, even in presence of a large proportion of sulphuric acid. With the hydrochlorate it is entirely different; with a greater admixture of acid to the neutral hydrochlorate its rotatory power is augmented, and the addition of concentrated acid so greatly increases it, that the rotatory power surpasses that of the free conchidia.

*Quinidia*.—Under this name the author designates, provisionally, an alkaloid which Kerner, before 1862, frequently met with in the sulphate of quinia of commerce, which he named first "*a quinidia*," and afterwards "*quinidia*," and which he describes (Zeitschr. f. Anal. Chemie, vol. i, p. 150) as forming large, short, unusually truncate prisms, which effloresce slowly. Its salts possess a remarkable dissimilarity to the corresponding salts of quinia, both in their form and in the degree of their solubility. The fact that its sulphate is stated to dissolve in 180 to 300 parts of cold water, inclines Hesse to the opinion that it is but a mixture, and he promises to continue experiments, made last year, with the object of obtaining this alkaloid from commercial cinchona barks, unless Kerner should make known his labors on the subject.

*Cinchonidia*.—Hesse adopts Pasteur's name for this base, because all the bases that have been so designated correspond to the cinchonidia of Pasteur, and, notwithstanding that he (Hesse) had previously adopted for it the name quinidia. Cinchonidia was first observed (1833) by Henry and Delondre, but their product contained a considerable quantity of quinia, and they had named it "*quinidia*." It was first accurately described by Winkler in 1847, who had obtained it from "*China Maracaibo*," the bark of *C. Tucujensis* (Karsten), as well as in an analogous bark of Huamilies cinchona, and was by him also named quinidia. Van Leers afterwards obtained it from the bark of *C. lancifolia*, var. *vera*, also called, in New Granada, *Tunita*; the bark known to this day in commerce as "*Carthagena bark*," and which at the present time shows variable quantities of this alkaloid. Pasteur discovered its presence, rarely it is true, in the commercial sulphate of quin-



idia, and since then it has been the subject of experiment by Wittstein, Wiggers, De Vrij, Crawford, Kerner, and others, with variable results.

Among the salts of cinchonidia the *neutral hydrochlorate* is principally noticed by the author. It crystallizes in monoclinic double pyramids, a form presented by no other combination of hydrochloric acid with a cinchona base. When an aqueous solution of this salt is concentrated at a gentle heat, radiating crystals are obtained, which, when allowed to remain for some time in the mother-liquor, are sometimes observed to disappear, and are transformed into compact crystals, containing one molecule of water, and corresponding to the formula of  $C_{20}H_{24}N_2O, HCl + 2H_2O$ . The sulphate crystallizes, from alcohol, with  $2H_2O$ , forming upon cooling slender white prisms. Cinchonidia turns the plane of polarized light to the left, as does quinia. Operating with alcoholic solution his results with the polarimeter agree with those of Scheibler, but differ from those of Pasteur. Kerner had described two cinchonidias,  $\alpha$  and  $\beta$  cinchonidia. The  $\alpha$  cinchonidia formed with hydrochloric acid a salt, which crystallized constantly in rhomboidal octahedra, and when the cinchonidia was saturated with sulphuric acid and comparatively little water, after cooling and standing some time the solution usually became gelatinous. It turned the plane of polarized light to the right. The  $\beta$  cinchonidia, Kerner satisfied himself subsequently, did not exist as a simple body. Hesse remarks that Kerner has obviously been deceived in his observations upon the optical effect of cinchonidia, and that his  $\alpha$  and  $\beta$  cinchonidia should be considered identical with Pasteur's cinchonidia, corresponding to Van Leer's quinidia. Regarding Wittstein's "cinchonidia," the marked difference between the characters given to his preparation and that of Pasteur, made it desirable that the author should make some direct experiments upon the same bark used by Wittstein. He succeeded in obtaining a portion of Wittstein's cinchonidia, and, from Prof. Wiggers, a portion of the same bark Wittstein had operated on. The results of his experiments prove Wittstein's cinchonidia to be a mixture of Pasteur's cinchonidia

and of cinchonia. Howard had made the statement that Wittstein's bark (from *Cinchona Palton*) contained also a peculiar alkaloid, *paltochina*, a modification of Pasteur's cinchonidia. This was determined, as was Wittstein's cinchonidia, to be simply a mixture of cinchonidia and cinchonia, and the author states that in all cases where the sulphate of cinchonia and sulphate of cinchonidia occur together in solution, a supposititious alkaloid, *i.e.*, a mixture of cinchonia and cinchonidia, will be originated.

*Cinchonia* was first observed by Duncan, and shortly afterwards by Gomez, but Pelletier and Caventou (1820) showed it to be a true vegetable alkaloid. It is yielded most abundantly from the barks of *C. succirubra*, *C. Pitayensis*, *C. Calisaya*, *C. ovata*, and *C. lancifolia*, and is easily obtained pure, owing to its sparing solubility in alcohol. Wilm and Caventou make the statement that hydrocinchonia is constantly present in cinchonia, and that its complete removal is not possible without the decomposition of the latter. This, the author finds, is a mistake, as far as the presence of hydrocinchonia, as a normal constituent of cinchona bark, is concerned.

*Hydrocinchonia* is formed in small quantities during the oxidation of cinchonia, and is, therefore, a decomposition product. The sulphate of cinchonia as well as the hydrochlorate or oxalate are readily obtained by boiling the alkaloid with the ammonia salts of the corresponding acids. The author's experiments upon the optical properties of cinchonia show that with sulphuric acid the rotatory power is increased for each molecule of acid entering into combination, but that it is again diminished by the addition of acid beyond its highest point of saturation. On the other hand, the rotatory power is diminished in the neutral hydrochlorate, but increased by an excess of hydrochloric acid.

*Aricina* was discovered by Pelletier and Caventou in 1829. It is also known as *cinchovatina*, and has been investigated by numerous experimentators, with widely different results and opinions as to its nature. Hesse has endeavored to obtain it from bark, described as containing it, but was unsuccessful.

He thinks that its existence is doubtful, and remains an open question.

*Paricina* was discovered by Winkler in 1845, in the barks of *Buena hexandra* and *Cinchona lutea*, and has since been shown to be a frequent constituent of *C. succirubra*, cultivated in the East Indies. It is precipitated from its saline solutions, like *beberina*, by nitric acid, and from the precipitated nitrate it may be obtained in alkaloidal condition by suspending it in alcohol, decomposing with ammonia, and agitating with hot petroleum ether, which, upon evaporation, leaves the alkaloid. The alkaloid, so obtained, is further purified by dissolving it in dilute hydrochloric acid, filtering the solution through animal charcoal, and precipitating the decolorized solution with ammonia in excess. So obtained it is pure, has a yellowish-white color, is soluble in water and in alcohol, is converted into a dark-green resin by strong nitric acid, and differs from *beberina* in being soluble in petroleum benzin, and in its melting-point. It requires further investigation, which the author promises to undertake.

*Quinamina* is not unfrequently found along with *paricina* and other alkaloids in the bark of *C. succirubra* from Darjeeling, but is present only in traces as a rule, so that its preparation requires much experience. The mixed alkaloids of such a bark are obtained in the usual manner, are dissolved in dilute sulphuric acid, and the solution is neutralized with ammonia. Cinchonina and quinia, if present, are precipitated as tartrate by means of neutral tartrate of sodium, the filtrate is then treated with ammonia in excess, and agitated with ether, which dissolves the *quinamina* and the amorphous bases. By the careful slow evaporation of the ethereal solution in a high cylindrical glass, a few crystals of cinchonina, which the ether had dissolved, are first separated, these are followed by long, intertwined, hair-like crystals, which are carefully removed before the amorphous alkaloids, forming a viscous fluid, solidify. The crystals are then washed with dilute alcohol, dissolved in hydrochloric acid, and a solution of bichloride of platinum is added as long as a precipitate is

produced. The liquid, filtered from the precipitate, is treated preferably with sulphuretted hydrogen to remove platinum, or it may be at once precipitated with ammonia. The so-precipitated quinamina is purified completely by recrystallization from boiling dilute alcohol.

Quinamina forms long, white, very light prisms, which are constant in the air, and contain no water of crystallization; 1 part is dissolved by 1516 parts of water at  $16^{\circ}$  C. ( $= 68^{\circ}$  F.), but it is more soluble in boiling water; 1 part is also dissolved by 105 parts of 80 per cent. alcohol at  $20^{\circ}$  C. ( $= 60^{\circ}$  F.), or 32 parts of ether, and is very freely soluble in boiling ether. Petroleum ether, lignöin, and bënzin, also dissolve it abundantly at a boiling temperature, and deposit the greater part on cooling. Its solutions are strongly bitter, have the property of neutralizing acids completely, and, when acid, readily decompose, depositing an amorphous base. Its composition corresponds to the formula  $C_2H_{28}N_2O_2$ . The author has prepared and describes the hydriodate, hydrochlorate, neutral sulphate, acetate, neutral tartrate, and acid tartrate, and some of the mercury, platinum, and gold compounds of the alkaloid. Quinamina deflects the ray of polarized light to the right.

*Paytina*.—This alkaloid was discovered by the author in a white bark from Payta, which has since, by Flückiger, been determined to resemble the cinchona barks very closely, although the source of the bark is still unknown. Paytina has a composition corresponding to the formula  $C_{21}H_{24}N_2O_2$ , and forms a sparingly soluble salt with hydriodic acid. Finally, the author considers the

*Amorphous bases* which are contained in the cinchona barks in greater or less quantities. The quality of these depends upon the quality of the crystallizable alkaloids contained in the bark, of which they are regarded by the author to be products of decomposition. Thus he finds that when the crystallizable alkaloids fail to produce with chlorine and ammonia a green coloration, the amorphous bases will likewise fail to produce this color; and if the green color is produced with the one it is certain to be produced by the other. In the first case, therefore, we may name the amorphous base

cinchonin; in the second quinin. But if the bark contains at the same time quinia and cinchonidia, or conchinea and cinchonia, then it is equally certain that the amorphous substance is a mixture. In view of these observations, therefore, the author does not agree with De Vrij that, for instance, the amorphous base in the bark *C. succirubra* is a distinct alkaloid. In fact, he has succeeded in separating the amorphous bases of this particular bark into two bodies, one of which produces a green coloration with chlorine and ammonia, while the other does not. Regarding the formation of the amorphous bases, the author's experience supports the observations of Pasteur in regard to quinia, that they are formed under the conditions to which they are subjected during their preparation, and thus quinia would form quinin, cinchonia, cinchonin, etc. He believes, however, that a large proportion of them are produced in the bark under various conditions. The author's experiments upon the effect of light on the cinchona alkaloids, seem to prove that its effect to modify them has been very much overrated. Neither in substance or in neutral solution is the influence of light very marked, but in acid solution of sulphate of quinia, after long standing, had formed a small quantity of brown-red amorphous substance, which no longer possessed the power to neutralize acids, and a large quantity of an amorphous substance, which possessed all the properties of quinin.

In conclusion, the author remarks that leaving the *amorphous bases* and *aricina* doubtful, the existence of the following cinchona alkaloids may be regarded as fully established: *Quinia*, *cinchonidia*, *cinchonia*, *paracina*, *quinamina*, *paytina*, and *conchinea*. The first three are well known in commerce; the *conchinea* is known in commerce as *quinidia*. The last three alkaloids, *quinamina*, *paytina*, and *conchinea*, form, it seems, a group together, and appear to be convertible one into the other under the influence of vegetable life, and thus would explain the fact, that in the bark of *Cinchona succirubra* quinamina is contained to the exclusion of conchinea. Ph. Jour. Trans., 1874, and Vierteljr. Pharm., 1873, Nos. 3-4.

*Cinchona Alkaloids*.—The assertion of Hager, that commer-

cial sulphate of quinia usually contains appreciable quantities of sulphate of cinchonia, has induced O. Hesse to make some experiments, which seem to prove Hager's statement to be incorrect. The latter had stated that he detected the sulphate of cinchonia by means of chloroform. Hesse, therefore, examined chloroform with reference to its power of dissolving the principal cinchona alkaloids, and has ascertained that pure chloroform is an excellent separant of the sulphates of these alkaloids, some being easily soluble in it, whereas others are difficultly soluble. According to his experiments, the following are the quantities of chloroform (sp. gr. 1.492) required to dissolve 1 part of the anhydrous sulphates of—

	Quinia.	Cinchonidia.	Conchinia.	Cinchonia.
At 61° to 62° C. (= 141.8° to 143.6° F.),	196.	800	9	22.4 parts.
At 15° C. (= 59° F.), about 1000	about 1000	about 1000	19.5	60 “

On evaporation of the chloroform solution of these salts at a gentle heat, the sulphates of quinia and cinchonidia remain behind in crystals, whilst the sulphates of conchinia and cinchonia are obtained as a transparent amorphous mass. These differences in solubility, etc., enable the determination of either of the last-mentioned alkaloids in admixture with the former two by the aid of chloroform, which consequently also affords an excellent means of determining the presence of the sulphates of conchinia and cinchonia in the so-called “sulphate of quinidia” (which is cinchonidia containing quinia). The chloroform should be of the purity above indicated, as even a trifling variation makes itself apparent in the proportion of quinia or cinchonidia salts dissolved. Six parts of a mixture of 2 volumes chloroform and 1 volume absolute alcohol dissolve as much as one part of sulphate of quinia, sulphate of cinchonidia being also readily dissolved by this mixture, which the author uses for examining sulphate of quinia for the sulphates of sodium, magnesium, and calcium, and other inorganic substances, salts of ammonium, mannite, cane-sugar, milk sugar, and starch, since these do not dissolve in the mixture. Ph. Jour. Trans., Feb. 14th, 1874, p. 649.

## IODINE COMPOUNDS OF SOME OF THE CINCHONA ALKALOIDS.

*Iodide of Quinia.*—According to Pelletier, when one part of iodine and two parts of quinia are triturated together with alcohol, iodide of quinia is first separated, and subsequently the hydriodate in the form of mushroom-shaped crystals. If the hydriodate is removed by hot water, the iodide remains in the form of a saffron-yellow, pulverizable mass, and has a composition of  $2C_{20}H_{24}N_2O_2, I_2$  ( $O=16$ ). H. R. Bauer finds this statement to be incorrect, and finds instead that two iodides are formed, one, of composition  $4C_{20}H_{24}N_2O_2, 3I_2$  ( $O=16$ ), which remains in alcoholic solution, is precipitated from such solution by water, and is formed in but small quantity; and the other, of composition  $4C_{20}H_{24}N_2O_2, 5I_2$  ( $O=16$ ), constitutes the portion insoluble in alcohol, is of a deep-brown color, and of nearly resinous consistence, but covered with isolated deep-brown needles.

*Hydriodate of quinia* was obtained by Bauer by accurately saturating hydriodic acid with the base. An excess of acid would form the acid modification. It is crystallizable in thin, light-yellow needles, sparingly soluble in cold water, but readily in alcohol and in ether. Winkler, who had obtained it by double decomposition between hydrochlorate of quinia and iodide of potassium, describes it as an amorphous terebinth-like mass, and found it soluble in water. Bauer assigns to his preparation the composition  $C_{20}H_{24}N_2O_2, HI$  ( $O=16$ ). The

*Acid hydriodate of quinia*, which has already been described by Hesse, was obtained by the author in the form of golden-yellow leaflets.

*Iodide of Quinia and Cinchonia.*—Such a compound, of composition  $C_{20}H_{24}N_2O_2, C_{20}H_{24}N_2O_2, 2I_2$  ( $O=16$ ), was obtained by Bauer by triturating equal parts of iodine, quinia, and cinchonia together, and washing the mixture with alcohol, which only dissolved traces of iodine and the alkaloids. The residue proved, under the microscope, to possess crystalline structure, and was insoluble in water and in alcohol, somewhat soluble in ether, and soluble in alkalies and in acids.

*Biniodide of quinia* was obtained by the author by adding



100  
solution of iodine in iodide of potassium to acid solution of sulphate of quinia; forming a voluminous kermes-brown precipitate, which by time became darker, and, by washing with water for some time, decomposed. It is soluble in alcohol, iodide of potassium solution, ether, chloroform, and bisulphide of carbon. It is specially soluble in boiling benzol. When dissolved in warm alcohol, crystalline leaflets, having a bronze lustre, are deposited on cooling, and are found to have the composition  $C_{20}H_{24}N_2O_4, HI$ , (O = 16). By precipitating acid sulphate of quinia from alcoholic solution (with iodide of potassium) a crystalline pentaiodide is produced, which in its physical properties resembles the biniodide, but, unlike the latter, is freely soluble in water, insoluble in benzol, and scarcely soluble in chloroform.

*Hydriodate of Cinchonia.*—The compound  $C_{20}H_{24}N_2O_4, HI + H_2O$  (O = 16) is obtained by the author when two parts cinchonia and one part of iodine are triturated together; the mixture is treated with alcohol (93 per cent. Tr.), and the solution is evaporated. Faintly-colored yellow needles, soluble in water, alcohol, and ether, and sparingly soluble in benzol and chloroform, are obtained. Contrary to Pelletier's statement, a portion of the mixture remains undissolved, the residue is

*Biniodide of cinchonia*, which remains in the form of saffron-yellow crystalline laminae, is readily soluble in absolute alcohol, ether, and chloroform, insoluble in water and in benzol, either cold or hot, and but sparingly soluble in bisulphide of carbon. From its solution in absolute alcohol it is precipitated by water unchanged. Composition  $C_{20}H_{24}N_2O_4, HI, + 2H_2O$  (O = 16).

*Tri-iodide of cinchonia* was obtained by the author by adding solution of iodide of potassium to a solution of sulphate of quinia, adding as much alcohol as was necessary to redissolve the voluminous red-brown precipitate, and evaporating the solution. Red-brown, columnar crystals were formed, which, by exposure to air are deepened in color (?), are insoluble in cold or warm water, cold benzol, absolute alcohol, and chloroform; sparingly soluble in ether and in bisulphide of



carbon. Its composition,  $C_{20}H_{21}N_2O, HI$ , ( $O = 16$ ). Arch. Ph., Oct. 1874, pp. 289–303.

*Action of Sulphocyanide of Potassium on various Cinchona Alkaloids.*—The observation of Stoddart that sulphocyanide of potassium has a peculiar reaction upon the salts of the cinchona alkaloids, has induced F. Schrage to try its effect upon a large variety of these salts, by which he has found that all of these salts show a characteristic reaction under the microscopic lens, much more so even than Stoddart credited, from whose method, however, it is necessary to deviate considerably. The conditions are: 1. Saturated solutions of the alkaloidal salts at the ordinary temperature, or, in some instances,  $10^{\circ} C.$  ( $=18^{\circ} F.$ ) higher. 2. A concentrated solution of sulphocyanide of potassium (equal parts), and, with sparingly soluble salts (neutral sulphate of quinia, etc.), instead of the solution a fragment of the sulphocyanide itself is used.

A drop of the filtered alkaloidal solution and another of the sulphocyanide, are placed side by side upon the object-glass, which is then covered with a thin glass plate, and allowed to remain perfectly at rest for about thirty minutes. To the naked eye the points of contact show white turbidity, which when the object-glass is placed under a lens of 110 diameters, exhibits the following appearances:

FIG. 49.

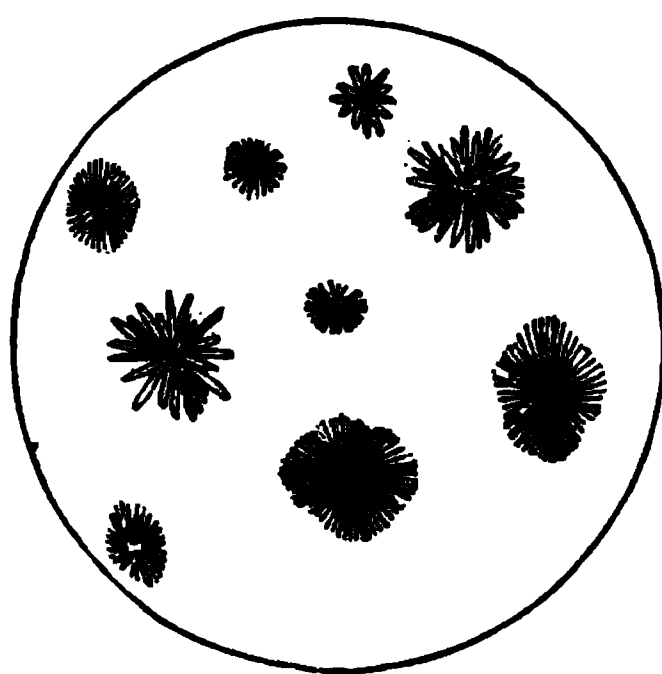
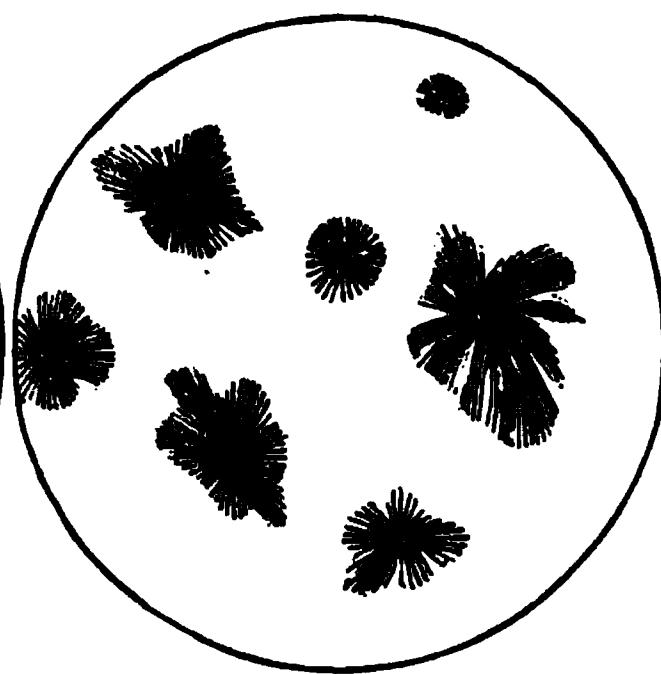


FIG. 50.



1. *Quinia Salts.*—The crystals, resembling thin spikes, are arranged in stellate form; the rays are more or less numer-

ous, and in some instances of the same length (neutral sulphate), in others of unequal length (acid sulphate). The stellate formations are isolated, or in small groups between amorphous and semi-amorphous masses. See Figs. 49 and 50.

2. *Cinchonia salts* are readily distinguished from the above at the first glance, showing somewhat coarser rays, which do not assume a stellate, but a fanlike arrangement; and these are not isolated, as are the quinia formations, but always in groups united by long rays. See Figs. 51 and 52.

FIG. 51.



FIG. 52.

3. *Quinidia salts* exhibit such characteristic formation as to be very readily distinguished from the other alkaloids, even when present in mere traces. When the quinidia and sul-

FIG. 53.

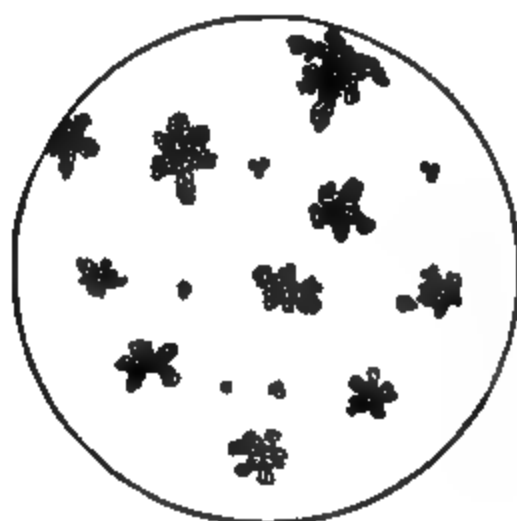
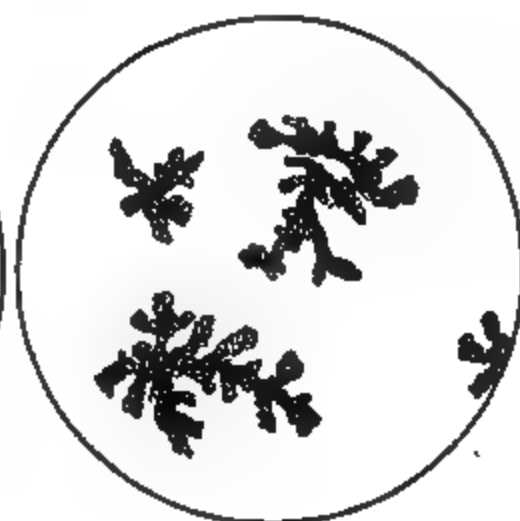


FIG. 54.



phocyanide solutions are first brought in contact, oily-like drops are formed, which appear brownish-yellow by trans-

mitted, and porcelain-white by reflected light. The round drops soon arrange themselves into groups, which resemble in their form the small branches of thuja, or foliaceous mosses. These formations occur with great certainty, although the time required varies more or less. See Figs. 53 and 54. Arch. Ph., Dec. 1874, pp. 504–507.

*Determination of Quinia in Cinchona Barks.*—Perset proposes a method, which is based upon the property of silicate of sodium to dissolve the cinchona alkaloids without changing them. 10 grams of the powdered bark are heated with 50 grams of alcohol of 90°, and 5 grams of strongly alkaline silicate of sodium (40° Baumé), for ten minutes, filtered, the process repeated with 30 grams of alcohol and 2.5 grams of silicate of sodium; and, finally, with 20 grams of alcohol. The united liquids are evaporated to the consistence of honey, the residue is exhausted with 30 grams, then with 20 grams; and, finally, with 10 grams of ether, the mixed ethereal solutions evaporated, and the residue acidified with dilute sulphuric acid. The so-formed sulphate of quinia may be estimated as such, since it contains only traces of quinidia and cinchonia; or it may be estimated as oxalate by precipitation of its solution with oxalate of ammonium. N. Rep. Ph., No. 10, 1874, p. 632.

*Quinia.*—A very pure and excellent product is obtained by the process of G. Boiraux and E. Léger, in which *coal oil* (see Hydrocarbons, in this report) is substituted for alcohol. The yellow cinchona bark is exhausted with water, acidulated with hydrochloric acid, at a boiling temperature. The liquor, obtained from 1000 grams of bark, is precipitated with milk of lime, washed, dried, and powdered; and, from a 3 per cent. bark, this will weigh about 150 grams. This is heated in a water-bath with sufficient *coal oil* to obtain 500 grams of solution, which is distilled with a solution of 30 grams of tartaric acid in a litre of distilled water, until about a litre, which contains all the coal oil, has passed over. The aqueous liquor remaining is filtered, precipitated with ammonia in slight excess, and heated in a water-bath with 250 grams of benzol.

The solution of quinia in benzol, being decanted, is distilled to one-half, and deposits on cooling handsome crystals of pure quinia. Ph. Jour. Trans., February, 1875, p. 662; Rép. de Pharm., ii, 377.

*Quinia.*—Jules Regnault has made some experiments on the solubility of *pure quinia* in water, alcohol, chloroform, and ether, with results which differ in some instances very materially with those usually accepted. This is especially true of its solubility in water, of which, at 15° C. (— 59° F.), it requires 350, 400, and 480 parts, as given by various authors; and at 100° C. (— 212° F.), 150, 200, 350, and 400 parts. The author's careful experiments determine that 1 part of pure quinia requires 2024 parts of water at 15° C. (— 59° F.), and 760 parts at 100° C. (— 212° F.).

The author's results with alcohol correspond very nearly to those of other authors. Dragendorff and Wurtz state its solubility in 2 parts of alcohol. The author, using absolutely pure and anhydrous ethylic alcohol, found that 1 part of pure quinia was soluble in 1.183 parts of alcohol at 15° C. (— 59° F.).

Chloroform is capable of dissolving 1 part of quinia in 1.926 parts at 15° C. (— 59° F.). According to Schlimpert, on the authority of Dragendorff, 1 part of quinia requires 6.58 parts of chloroform; Pettenkofer, however, had found it soluble in 1.801 parts.

The solubility of quinia in ether at 15° C. (— 59° F.) was found to be 1 part in 22.682. The author cites, in contrast, the solubility given by Dragendorff, on the authority of Pettenkofer, according to which 60 parts of ether are required. It is very evident that the author consulted only *French* works of reference, else he would have found authorities which correspond very closely with his own results in respect to the solubility of quinia in ether.

With the aqueous solution of quinia, the author has determined that a solution of 1 part of quinia in 2000 parts of

parts of water, was still affected by tannic acid. The fluorescence of quinia, in 2000 parts of water, becomes scarcely visible, although, by the method proposed by Stokes, the extreme limit is in 20,000 parts. By the addition of sulphuric acid, however, the fluorescence becomes twenty times more energetic, and is still visible in 500,000 parts of water; on the addition of hydrochloric acid it is, however, instantly destroyed, as already pointed out by Stokes. A. J. Ph., March, 1875, pp. 122-126.

*Quinia.*—The presence of quinia in urine may, according to Vitali, be detected most readily by rendering the urine alkaline, and agitating with ether; 8 to 10 c.c. of urine and 5 to 6 c.c. of ether answering for the test. The ethereal solution, upon evaporation, leaves an insignificant residue, to which a drop of chlorine-water added, followed by ammonia, produces the well-known green color. Ch. Centralbl., No. 42, 1874, p. 663; J. Chim. Méd., 1874.

E. Salkowski, referring to the above, states that he has used the method for some years, and has found that when very small quantities of quinia are present, the reaction is often unsatisfactory. He states that the sensitiveness of the reaction may be very materially increased if the residue, remaining after the evaporation of the ether, is redissolved, rendered alkaline by ammonia, again shaken with ether, and the test repeated. Ibid., and Med. C. Bl., 1874, p. 718.

*Neutral Hydrobromate of Quinia.*—Boille prepares this salt by gradually adding an alcoholic solution of neutral sulphate of quinia to an alcoholic solution of bromide of barium until no further precipitate occurs. The mixture is diluted with water, and the alcohol distilled off; it is then filtered to separate the precipitated sulphate of barium, and on concentrating the filtrate an abundant crystallization of hydrobromate of quinia takes place. The author is of opinion that the neutral hydrobromate possesses many advantages over the neutral sulphate of quinia, being richer in quinia and more soluble in water. A. J. Ph., June, 1875, p. 278; J. Pharm. Chim. (4) xx, 181-187.

*Valerianate of Quinia.*—Landerer examined some valerianate of quinia of French manufacture, and found it to consist of sulphate of cinchonia, which was impregnated with valerianic acid and oil of valerian. It possessed a very penetrating odor of the latter. In connection with this subject, the author ventures the opinion that valerianic acid from the root should be preferred to the artificial acid. He fails, however, to give any experimental testimony. Schweiz. Wochenschr., July 3d, 1874, p. 220.

*Tannate of Quinia.*—A perfectly colorless tannate of quinia, of the composition  $C_{20}H_{24}N_2O_4, 2C_{12}H_{10}O_5$ , is obtained, according to Regnault, as follows: An aqueous solution of acetate of quinia is treated with solution of gallotannic acid, until the tannate of quinia, at first formed, is again dissolved by agitation. The clear liquid is then treated with dilute caustic or carbonate of ammonium, or bicarbonate of sodium, until neutral. The precipitate is collected on a filter, drained, and dried in the air. The tannate so prepared is freely soluble in alcohol, but insoluble in water, which, however, abstracts tannic acid. 1.0 of sulphate of quinia is represented by 3.5 of this tannate. Ph. Centralh., No. 6, 1875, p. 41; Rep. de Ph.

A perfectly neutral tannate of quinia is obtained, according to Mathias Rozsnyay, by dissolving neutral sulphate of quinia in boiling water, and adding to this a solution of tannic acid neutralized with diluted solution of ammonia. The preparation is perfectly tasteless, much more soluble in the stomach than the ordinary article, and seems to possess other therapeutic advantages; 2.5 parts correspond to 1 part of neutral sulphate of quinia. Ph. Centralh., No. 13, 1875, p. 106.

*Salicylate of Quinia* is readily obtained, according to J. Jobst, in the form of a curdy precipitate when aqueous solutions of muriate of quinia and salicylate of ammonium are mixed. The precipitate may be dissolved in alcohol, which yields the quinia compound in wonderfully fine perfect crystals, arranged in concentric groups. The same compound is formed upon evaporating slowly an alcoholic solution of the salt, obtained by saturating an alcoholic solution of salicylic acid

(Kolbe's) with an alcoholic solution of quinia. Salicylate of quinia is anhydrous, has a composition corresponding to the formula  $C_{20}H_{24}N_2O_7, C_7H_6O_2$  ( $O = 16$ ), dissolves in 225 parts of water at  $16^\circ C.$  ( $= 60.8^\circ F.$ ), in 20 parts of 90 per cent. alcohol (by volume), at  $13^\circ C.$  ( $= 55.4^\circ F.$ ), and in 120 parts of ether at  $16^\circ C.$  ( $= 60.8^\circ F.$ ). Ph. J. Trans., June 12th, 1875, p. 986; from Ph. Zeitung, No. 11, 1875.

*Carbolate of Quinia.*—Julius Jobst has obtained this salt in crystals of the formula  $C_{20}H_{24}N_2O_7, C_6H_6O$  ( $O = 16$ ), both from aqueous and alcoholic solution. Hitherto it had only been met in pulverulent form, and of uncertain composition and properties. It dissolves in 400 parts of water at  $16^\circ C.$  ( $= 60.8^\circ F.$ ), in 80 parts of 90 per cent. alcohol at  $13^\circ C.$  ( $= 55.4^\circ F.$ ), and slightly in ether. The author considers that henceforth the crystalline salt only should be used, as it can readily be obtained, and is definite in composition. Ph. Jour. Trans., June 12th, 1875, p. 986; from Ph. Zeitung, No. 11, 1875.

*Neutral Sulphovinate of Quinia* is prepared by P. Jaillard by introducing 8.71 grams of officinal sulphate of quinia into a boiling solution of 4.27 grams of sulphovinate of barium in 100 grams of distilled water, observing that both salts are completely decomposed. The filtrate, upon evaporation on a water-bath, forms a syrupy mass, which, on cooling, forms a crystalline mass; this is dried either by pressure or under a bell-glass over burnt lime, and is powdered. Thus prepared it is soluble in 2 parts of water, forming a solution well adapted for hypodermic purposes. If the salt is prepared from sulphovinate of sodium and sulphate of quinia, in the presence of alcohol, it is less soluble in water, requiring 4 parts. A. J. Ph., May, 1875, p. 213; Rép. de Ph., 1875, p. 102.

*Commercial Quinidia.*—O. Hesse communicates some further observations on this subject in Liebig's Anal. d. Chemie (May, 1875). The commercial sulphate of quinidia is usually cinchonidia containing some quinia; occasionally, however, it is composed of conchinia containing some cinchonidia, and sometimes contains only cinchonina. He recommends the fol-

lowing method for determining cinchonia and conchinea, as well as some worthless impurities in sulphate of quinia (commercial?). One gram of the sulphate is mixed with 7 c.c. of a mixture of two volumes of chloroform and one volume of absolute alcohol, which will leave any inorganic impurities undissolved. A second portion of the sulphate is digested with forty parts of water at 60° C. (— 140° F.), and three parts of Rochelle salt are added, the mixture is allowed to stand an hour and is then poured on a filter. The filtrate from the quinia and cinchonidia precipitated is precipitated with ammonia, whereby cinchonia or conchinea is indicated. If to 20 c.c. of the warmed filtrate 0.5 to 1.0 part of iodide of potassium is added, any precipitate produced after standing an hour will evidence conchinea. The liquid filtered from this precipitate will, upon addition of ammonia, produce a precipitate of cinchonia. For the success of this method, which enables the rapid qualitative determination of the constituent parts of the so-called "quinidia" of commerce, it is necessary that the salt be completely neutral. Schweiz. Wochensch., No. 23, June 11th, 1875, p. 193.

*Cinchonia*.—Operating by a method very similar to that for quinia (which see), G. Boiraux and E. Léger obtain cinchonia from gray Huanoco bark, without the use of alcohol. The precipitate, obtained by the milk of lime, is first treated with boiling *coal oil* (see Hydrocarbons, in this report), which dissolves any quinia present, but leaves the cinchonia intact. It is then dried and displaced with *carbolyzed coal oil* (for 1000 grams bark sufficient to obtain 500 grams of percolate), and the percolate is distilled in a retort with solution of tartaric acid (for 1000 grams bark 30 grams acid and 1 litre of water) until all of the carbolic acid and coal oil have passed over. The nearly colorless solution of tartrate of cinchonia is filtered from a resinous layer after cooling, and precipitated by ammonia. Ph. Jour. Trans., Feb. 1875, p. 662.

*Quinamina*.—De Vrij recommends the following improvement on the method originally proposed by its discoverer, O. Hesse. Powdered red bark from British Sikkim (the bark



of *C. succirubra*) is extracted by displacement with dilute hydrochloric acid, the liquid is precipitated with solution of caustic soda, the alkaloids obtained converted into neutral sulphate, and from the mixture the quinia and cinchonidia precipitated with Rochelle salt. The filtrate is then agitated with hydrate of sodium and ether, which takes up the quina-mina. After standing twenty-four hours the ether is decanted, evaporated, the residue dissolved in acetic acid, and treated with sulphocyanide of potassium, which precipitates the amorphous bases. Upon precipitating the filtrate with hydrate of sodium the quinamina is obtained in the form of a snow-white substance, and is, after washing and drying, crystallized from weak alcoholic solution. The yield is 0.38 per cent., while Hesse obtained only traces, seldom 0.1 per cent., and once only, 0.3 per cent. The author believes that this alkaloid is only contained in the *C. succirubra* growing in British Sikkim, as he has been unsuccessful in obtaining it from other red cinchona barks. Arch. Ph., Oct. 1874, p. 371.

*Aricina*.—In view of the doubts expressed by O. Hesse as to the existence of the cinchona alkaloid, *aricina*, D. Howard has endeavored to obtain some fresh light upon the subject. J. E. Howard placed a portion of the aricina-yielding bark, still in his collection, at the author's disposal, which, while too small to give much hope for a sufficient supply of alkaloid for an investigation, enabled him to prepare a quantity of alkaloid, which is, without a doubt, perfectly distinct from any other alkaloid of the cinchona barks. As to the other constituents of the bark (of *C. Pelletieriana*, Wedd.), the author found kinic acid and kinovine, but failed to obtain any traces of cinchotannic acid or cinchona-red. It contains, however, an intensely yellow coloring matter, little soluble in water, but freely soluble in spirit, to which it gives a beautiful green fluorescence.

The study of the alkaloid presents special difficulties, on account of the rapid changes occurring in the solutions of the crude alkaloid. It was obtained approximately pure, however, and was found to be freely soluble in ether; its saline solutions were not precipitated by Rochelle salt; its iodide is

moderately soluble in water, and is not crystallizable from aqueous or alcoholic solutions, and it forms a sparingly soluble sulphocyanide and a like platinum salt. Its sulphate, as described by Pelletier, possesses in a well-marked degree the property of gelatinization; but he failed to obtain it, as described by that author, in the form of crystals from alcoholic solution. Its salts are precipitated yellow by nitric acid or nitrates, which may, however, be owing to the presence of paracina, with which, and beberina it appears to be closely allied. The ignition of the platinum salt gave percentages corresponding very closely with those given by Manzini for the platinum salt of cinchovatina. Ph. Jour. Trans., May 15th, 1875, p. 908.

*Strychnia* and *Brucia* are obtained by the process of G. Boiraux and E. Léger at the same operation: 1000 grams of grated nux vomica seeds are exhausted by boiling three times successively for half an hour, with water acidulated with sulphuric acid, using respectively 6, 4, and 4 litres of water, and 20, 10, and 5 grams of acid, the marc being pressed strongly after each boiling. The united liquors are concentrated to 4 litres, precipitated by milk of lime, and the precipitate dried and powdered. The powder is treated by percolation with sufficient cold carbolized coal oil (see Hydrocarbons, in this report) to give 500 grams of percolate, which is distilled with a solution of 15 grams of tartaric acid in a litre of water, until all the coal oil has passed over, and about 500 grams of solution remain in the still; this sometimes has a little fat or resinous matter floating on top. The solution is filtered, precipitated with ammonia, the precipitate washed and dried. To separate the strychnia and brucia, which the authors state exist in the seeds in about equal proportions (?), advantage is taken of the solubility of the former and complete insolubility of the latter in the lighter oils, the mixture of the two alkaloïds being exhausted with benzol in repeated portions, and, by the aid of heat, as long as a portion of the benzol solution leaves upon evaporation a residue colored red by nitric acid. The benzolic solution yields an abundance of brucia in crystals when it is evaporated. The authors also give a method for

preparing brucia alone from strychnos bark, which is essentially the same as the above, coal oil being used to extract the precipitate, instead of carbolized coal oil. Ph. Jour. Trans., February, 1875, p. 661; Rép. de Pharm., ii, 377.

*Tri-iodide of Strychnia* —  $C_{21}H_{22}N_2O_3, HI_3$  (O = 16); had previously been obtained by Herapath, who obtained it by warming together 1 part of strychnia, 1 part of alcohol, 3 parts of water, and a little (?) tincture of iodine; upon cooling, six-sided columnar crystals are deposited, and were found to have the composition  $C_{21}H_{22}N_2O_3, I_3$ . H. R. Bauer has obtained the salt, of the composition above given, by adding solution of iodine to a solution of sulphate of strychnia, redissolving the precipitate by alcohol, and evaporating. Violet-colored columnar crystals, resembling permanganate of potassium, were obtained. The salt is readily dissolved by alcohol, but more difficultly in water, ether, chloroform, benzol, and bisulphide of carbon. Arch. Ph., October, 1874, p. 307.

*Tri-iodide of Brucia* has been obtained by H. R. Bauer by precipitating solution of sulphate of brucia with solution of iodine, washing the precipitate (with water?) by decantation, dissolving it in (hot?) alcohol, and allowing it to cool slowly. Bronze-colored crystals are deposited, which are soluble in alcohol, chloroform, and benzol; insoluble in water, ether, and bisulphide of carbon; soluble also in warm dilute acids, but decomposed by them by continued action. Composition —  $H_{22}N_2O_3, HI_3$  (O = 16). Arch. Ph., October, 1874, p. 308.

*Conversion of Brucia into Strychnia*.—Prof. Sonnenschein announces the important discovery, made by him, that brucia may very readily be converted into strychnia. If brucia is heated gently with four to five times its weight of nitric acid, the usual red coloration is produced, accompanied by abundant evolution of gases, among which carbonic acid has been determined. Upon concentrating the solution on a water-bath, mixing it with excess of potassa, and agitating with ether, the ethereal solution leaves, upon spontaneous evaporation, a reddish-colored mass, which contains a red coloring matter, a yellowish resin, and a base. By recrystallization from acid

solution this base is obtained pure, and is found to possess all the reactions of strychnia, possesses its excessively bitter taste, forms a hydrochlorate corresponding to the strychnia compound in its solubilities and crystalline structure, and which contains a very nearly corresponding percentage of Cl 9.20 per cent., 9.58 per cent. being required. The formula of brucia being  $C_{22}H_{22}N_2O_2$ , and that of strychnia  $C_{22}H_{22}N_2O_2$  (O—16), consequently differing widely; the conversion of the brucia into the strychnia may, nevertheless be explained by assuming the absorption of 4 atoms of oxygen, and elimination of 2 atoms of water, and 2 atoms of carbonic acid. No ultimate analysis of the author's product seems to have been made.

Experiments made upon strychnia seem to indicate that by the action of strong bases it is reciprocally converted into brucia. By heating the alkaloid with potassa, soda, baryta, etc., and water in a sealed tube in a water-bath for a long time, among others a body is formed, resembling brucia very closely in its reactions. The experiments will be continued. Both reactions necessitate care when making forensic examinations for either of these strychnos alkaloids. Ph. Central-halle, No. 21, 1875, p. 169.

*Brucia.*—The sensitive reaction of brucia with nitric acid, *i. e.*, the production of a red color, has, as is well known, been proposed as a test for the presence of nitric acid in potable waters. The method recommended by Böttger consists in placing 3 drops of the water into a small porcelain capsule, then adding 2 drops of a solution of brucia, and finally 2 to 5 drops of chemically pure concentrated sulphuric acid. A. Vogel draws attention to the fact, already observed by others, that the purest sulphuric acid will produce a faint red coloration. Whether this is caused by the presence of a minute quantity of nitric acid, or whether it is properly a reaction between sulphuric acid and brucia, the author does not claim to decide. But, based upon this observation, he recommends that the brucia be first mixed with the sulphuric acid, and that the water under examination be added afterwards, when, if nitrates are present in it, the red color produced by the sulphuric acid will be deepened.

The author also draws attention, in this connection, to the characteristic color change which occurs when to the brucia mixture, reddened by nitric acid, a little crystalline protochloride of tin is added. An intense violet color is immediately produced as a rule; but occasionally, from no apparent cause, this change of color does not take place. The author draws attention to this peculiarity in order to invite experiments in this direction, and to determine, if possible, the precise conditions necessary to the peculiar color change. N. Rep. Ph., 1874, No. 5, p. 264.

*Brucia*.—A new reagent for brucia is found by Professor Flückiger in mercurous nitrate, the exact composition of which is a matter of no consequence; a reagent, sufficient for the purpose, being readily obtained by pouring nitric acid, sp. gr. 1.20, upon mercury, evaporating to dryness with metallic mercury in excess, and dissolving the soluble portion of the mass in hot water. Such a solution does not produce a red color when brought in contact with brucia, such as is produced by free nitric acid. But when added to a solution of brucia, and heating the mixture upon a water-bath, a handsome carmine-red color is gradually produced, and will be retained upon evaporating to dryness. In this respect the new reagent differs very materially from all other color reagents for brucia, which produce temporary coloration only. Neither strychnia, the alkaloids of opium or cinchona, veratria, coffeina, or piperin, produce such a reaction. Albumen and phenol produce a similar reaction with the new reagent, but these would be excluded by the course of separating the brucia. The separation of brucia from admixture with strychnia may be effected by the difference in the behavior of their acetates when evaporated to dryness, the strychnia salt losing its acetic acid nearly completely, while the brucia salt is comparatively little affected, and may readily be separated from the alkaloidal strychnia in a comparatively pure condition.

*Atropia*.—The process of preparing this alkaloid without the intervention of alcohol, as proposed by Boiraux and Léger, is as follows: 500 grams of carefully prepared aqueous

extract of belladonna leaves is mixed with 125 grams of solution of caustic soda (soapmaker's lye), in a porcelain capsule, which must be surrounded with water to prevent heating. As soon as the mixture has liquefied it is reduced by distilled water to the consistence of a thick syrup, and is then poured into a three-litre flask containing two litres of benzol (see Hydrocarbons, in this report) in small portions, stirring after each addition. After the liquid separates into two layers the upper—benzol—layer is decanted, and the lower layer is poured with the same precautions into two pints more of benzol. On separation of the latter it is added to that first decanted, and the mixture is shaken twice successively with dilute sulphuric acid; first, with 5 grams acid to 75 of distilled water, and next, with 2 grams acid and 25 grams water. The aqueous solution of sulphate of atropia, so obtained, is treated with solution of caustic soda as long as a precipitate is produced, and is then shaken with 100 and then with 50 grams of well-rectified benzol. The solution of pure atropia yields upon evaporation perfectly white, long, silky needles. The author details various precautions necessary to success, for which see Ph. Jour. Trans., Feb. 13th, 1875; from Rép. de Pharm., vol. ii, p. 377.

*Atropia*.—Calmborg observes that atropia is faintly browned (carbonized) by the addition of concentrated sulphuric acid, while nitric acid dissolves it at once without the slightest color. These observations are in contradiction with the Ph. Germ., according to which sulphuric acid forms a colorless solution, changed to yellowish on standing, while nitric acid dissolves it with yellow coloration and becomes colorless on standing. The author prefers the chloride of gold and the tincture of iodine tests; the former producing in solutions of the sulphate sulphur-yellow crystals, and the latter a kermes-brown precipitate. Arch. Ph., Nov. 1874, p. 422.

*Atropia*.—It has been stated of atropia that it frequently causes pain when applied to the eye in the familiar form of "drops" (solution of sulphate?). The effect may be partly attributed to idiosyncrasy or intolerance of the remedy in

any form ; but other instances more frequently occur to which this explanation does not apply. With a view to determine the reason for this, W. Willmott has made some experiments and observations, based upon the following possible sources of the mischief residing in the atropia, viz. : 1. Impurity ; 2. Acidity ; 3. Change of condition by long keeping.

Respecting the first of these conditions, the author finds that the atropia of commerce is readily obtainable from responsible houses in a pure condition. He, furthermore, has observed that notwithstanding the undoubted purity of solutions of atropia, their application occasionally produces pain, and that this is attributable to a peculiar phase of the disease or to influences dependent upon the patient's occupation, etc. Acidity was found not to possess the slightest irritating effect when present to the extent that it might be under the most unfavorable circumstances; the author having added small proportions of acid purposely, and did not hear of the slightest irritation. Neither can the effect be ascribed to a decomposition of the atropia solution. A solution in the author's possession, made five years ago, does not show the slightest change.

The author concludes that possibly dust and dirt are among the causes to which the irritation must sometimes be ascribed. *Ph. J. Trans.*, April 10th, 1875, p. 802.

In the discussion on the above paper (read at a meeting of the Pharm. Society), Mr. Lingford, alluding to a statement in the author's paper, that solution of atropia, which had been dispensed neutral, and of which that in stock had remained, had been returned in an acid condition, suggests that the acid might have been derived from the secretions of the patient's eye. Mr. Williams believed he knew that certain atropias, or so-called atropias, did irritate the eye, while others were devoid of this property. Hence the controversy on the subject between German and English chemists, the one accusing the other of using "belladonna" instead of atropia. It would be interesting, therefore, to determine which of these, if any, possesses irritating properties. *Ibid.*, p. 818.

*Veratria*.—The following simple method of its preparation



by the intervention of coal oil (see Hydrocarbons, in this report), is proposed by Boiraux and Léger: 500 grams of powdered *sabadilla* seeds are moistened with diluted caustic soda, kept during two days in a close vessel, dried in a stove, and the dry powder treated by displacement with coal oil until one and a half litre of percolate is obtained. The percolate is introduced into a retort, a solution of 5 grams of tartaric acid in a litre and a half of water is added, and the mixture is distilled over a sand-bath until about 500 or 600 grams of liquid remain in the retort, which will be found colorless, and surmounted by a small layer of fixed oil which has escaped the action of the caustic soda. After cooling, the liquor is filtered through moistened paper, and the clear solution of tartrate of *veratria* is precipitated by ammonia. About 10 grams of perfectly white and pure *veratria* may then be obtained for every kilogram of the seeds. *Ph. Jour. Trans.*, Feb. 18th, 1875, p. 643; from *Rép. de Pharm.*, ii, p. 377.

*Veratria*.—According to Herm. Weppen, Schneider's test for alkaloids, sulphuric acid, and sugar, gives with *veratria* very characteristic color reactions. It is well known that when concentrated sulphuric acid is brought in contact with *veratria* an intense red color is produced. If, however, the *veratria* is first mixed with a little sugar, the red color does not appear at all, a faint yellow color is produced, which changes after a time to dark green and then to a splendid deep blue. The reaction is exceedingly sensitive, the blue color being produced with the minutest trace; but then it remains but a short time. With one-tenth milligram it is azure blue, and remains ten to fifteen minutes when in thin layers; in thick layers it is deep blue, remains so about two hours, then changes to dark indigo-blue, acquires a reddish tinge and, finally, becomes dirty-brown. If a small drop of water is added after mixing the sulphuric acid with the *veratria* and sugar, an intense blue color is immediately produced without the intermediate green coloration; but when operating on very small quantities (traces) of the alkaloid care



must be taken not to add too much water, simple breathing on it serves the purpose. Arch. Ph., Aug. 1874, pp. 112–113.

*Tri-iodide of Veratria* =  $C_{32}H_{54}N_2O_8, HI_3$  (O = 16) has been obtained by H. R. Bauer, by adding solution of iodine to a solution of a veratria salt, adding alcohol to redissolve the precipitate, and evaporating the solution. A red-brown amorphous mass is formed, which is readily soluble in alcohol, in chloroform, and in ether; very sparingly soluble in bisulphide of carbon; insoluble in water and in benzol, cold or hot. If the solution is evaporated at a temperature above  $60^\circ C.$  (=  $140^\circ F.$ ), a tarry mass, which cannot be removed from the evaporating vessel, is formed.

*Periodate of Veratria* separates, according to the same authority, when alcoholic solution of veratria is mixed with periodic acid, forming a resin-like mass which, under the microscope, is found to contain crystals. The author has not concluded his experiments with this compound. Arch. Ph., Oct. 1874, pp. 305–306.

*Aconitia*.—T. B. Groves contributed some valuable researches upon the aconitines at the meeting of the British Pharmaceutical Conference (1874). By a modification of the process of Stas he obtained from 200 pounds of the roots of *Aconitum Napellus* 13 drachms of pure white crystals, presumably nitrate of aconitia, but found by subsequent experiments to be a mixture of nitrate of aconitia, and of the nitrate of an alkaloid, which resembles very closely the active principle of *Aconitum heterophyllum*, discovered by Broughton, and named by him *atisina*. This latter is a simple bitter alkaloid, devoid of acidity. From the mother liquors the author obtained *pseudaconitia*, together with a very large quantity of the bitter alkaloid before mentioned. The author will continue his researches. Proc. Br. Ph. Conf., 1874, p. 507.

*Aconitia*.—G. Boiroux and E. Léger obtain it by the following method: Aconite root, coarsely powdered, is exhausted by displacement with boiling water containing 1 per cent. of tartaric acid. The product is concentrated to a thick, syrupy consistence, and, having been rendered strongly alkaline with

caustic soda, and allowed to cool, is gradually poured into benzol, as directed for atropia (which see). The benzolic solution is decanted, shaken with water, acidulated with tartaric acid, and the aqueous solution of tartrate of aconitia is precipitated by ammonia. The precipitated aconitia, when washed and dried, constitutes a white powder. Ph. Jour. Trans., Feb. 1875, p. 662; Rep. de Pharm., ii, 377.

*Aconitia*.—It has been observed that aconitia, prepared by Hottot, of Paris, possesses more activity than does that of German or English manufacture. Hager attributes this to the fact that Hottot's aconitia has been completely dried, while the German and English aconitia contains more or less water, 20 per cent. of which may be present without influencing its pulverulent condition. The German Pharmacopœia evidently intends the latter, since it gives its solubility in 50 parts of hot water, which Hager considers insufficient for the anhydrous alkaloid. Aconitia should be heated upon a water-bath as long as it loses weight, and the maximal dose of such a product should be reduced to 0.003. Ph. Centralhalle, No. 51, 1874, p. 417.

*Guarana*.—According to J. William, the alkaloid of guarana may be readily extracted from the powder by mixing it with slaked lime, moistening it (with water?), allowing it to stand an hour or two, drying the mass, extracting it by boiling benzin, distilling off the benzin, filtering through wet paper, and extracting with boiling water. Am. Dr. Circ., April, 1875, p. 77.

*Colchicia*.—Ottmar Eberbach has contributed a very valuable paper on "A Working Formula for Colchicia," in which he recommends such a formula. He seems to have succeeded to obtain colchicia in the crystalline condition. See Proceedings, 1874, p. 453.

*Berberina*.—Klunge has discovered a reaction for berberina which is said to be much more delicate than any hitherto described. It consists in adding chlorine-water to an aqueous solution of the alkaloid, strongly acidified by sulphuric or hydrochloric acid. With  $\frac{1}{1000}$ th of berberina, a band of a

lively red color is formed at the point of contact, and on shaking the color spreads throughout the liquid. With  $\frac{1}{1000}$ th a rose tint is produced. Brucia also gives a red coloration with chlorine, but the brucia solution being originally colorless, while the berberina is perceptibly yellow to  $\frac{1}{1000}$ th, and other reactions readily distinguish the two. The red coloration of the berberina solution persists for some time if too much chlorine-water has not been employed. Chem. and Drug., April 15th, 1875, p. 115 ; from J. de Ph. et de Chim., March, 1875.

*Neutral Hydrobromate of Eserina* (physostigmia) has been obtained by Duquesnel in the form of stellate groups of crystals, and fibrous crystalline cysts, which, while slightly colored, yielded colorless solutions. The salts of eserina are generally uncrystallizable, and very hygroscopic. This presents an exception to this rule, keeping perfectly even in a humid atmosphere. It is, moreover, perfectly soluble in water. The *sulphate*, which is ordinarily in the amorphous state, seems, by absorption of moisture, to assume crystalline structure occasionally. While ordinarily of a yellowish to reddish color, it may be obtained colorless by preventing the oxidizing action of air completely, which converts it into a crystallizable but inert substance. Ph. J. Trans., April 24th, 1875, p. 847 ; from Rep. de Pharm.

*Lycina and Betaïna*.—A. Husemann shows that in all probability the alkaloid *lycina*, discovered by the author and Marmé (in 1863) in *Lycium barbarum*, L., is identical with the *betaïna* of Scheibler, discovered in 1866 in the juice of the sugar-beet. Liebreich had already determined the identity of betaïna with his *oxyneurin*, obtained from the protagon of the brain-substance. The two substances possess the same formula —  $C_8H_{11}NO_2$  ( $O = 16$ ), the same relation to solvents, are both very hygroscopic, are non-poisonous, and yield, by the action of melting potassa, trimethylamin. The composition of their hydrochlorates, their crystalline form, and their general properties are also identical. Arch. Pharm., March, 1875, p. 216.

*Delphinia* may be obtained from stavesacre seeds, according to the process recommended by Boiraux and Léger for veratria, which see, in this report.

*Iodide of Conia*.—H. R. Bauer has obtained it in well-defined octahedral crystals by adding to an alcoholic solution of conia alcoholic solution of iodine, leaving, however, conia in excess. Upon evaporation of the alcoholic solution a faint yellow mass remained, which was soluble in water, alcohol, ether, and chloroform, but insoluble in benzol, and almost insoluble in bisulphide of carbon. From this perfectly formed octahedrons were obtained by solution in water, and exposure for weeks over chloride of calcium. Crystals may also be obtained from ethereal solution, forming, in that event, star-like groups. The composition of the compound leads to the formula  $\text{C}_8\text{H}_{15}\text{N}, \text{I}, \text{IH}(\text{O} = 16)$ . Arch. Ph., Sept. 1874, p. 214.

*Anilin Colors produced without Arsenic*.—A Berlin company, the "Gesellschaft für Anilin Fabrikation," is successfully working Coupier's method for the production of anilin colors without the use of arsenic acid. This method, which was proposed a number of years ago by Coupier, of Paris, consists in acting upon pure anilin or nitrotoluol by hydrochloric acid and iron, in small quantities, at a suitable temperature. Schützenberger confirmed Coupier's experiments, and showed that the anilin red so produced was not only identical with that obtained by the usual methods, but that the yield was also somewhat greater. The process was not applied industriously until 1872, when Meister, Lucius and Brüning, of Hoechst, Germany, succeeded in working it on a large scale; but this firm seems to have fallen back, partly at least, on the old method, since they still supply the market with colors containing arsenic. In the recently-erected works of the Berlin company no arsenic whatever is used in the preparation of colors, which are so warranted. Several important modifications of Coupier's process have been introduced, and the company is thereby enabled to produce from 200 to 300 kilograms of fuchsin per diem. Some specimens of fuchsin and other colors manufactured by this company

appear to be products of unrivalled beauty, purity, and strength. The fuchsin is stated to be not only purer, but stronger than that made by the aid of arsenic acid, and is, in fact, pure hydrochlorate of rosanilin. The latter, from its purity, is admirably adapted for the preparation of anilin blue, and is largely used by other manufacturers of anilin colors. Being free from arsenic these dyes are fitted for coloring sweetmeats, liquors, syrups, and pharmaceutical preparations of every description, not to speak of the advantage of their use, over the poisonous arsenical colors, in various industrious processes and applications. Ch. News, Feb. 5th, 1875, p. 56.

*Nitrate of Anilina.*—This salt promises to serve a useful purpose for preparing *fuchsin* without the intervention of arsenic. B. Jegel finds that where it is attempted to prepare it with excess of nitric acid, and recrystallization from aqueous solution, it is very prone to decomposition; evolving very penetrating fumes, and forming a black insoluble substance. It may be crystallized readily, however, from its solution in anilina, and is then permanent and in the form of colorless crystals. When these are heated with anilina a deep violet blue compound is produced, together with a small quantity of fuchsin. This violet blue compound seems to be a peculiar base; is soluble in concentrated sulphuric acid, forming a blue solution with a red fluorescence; is soluble also in alcohol and in concentrated muriatic acid; but is insoluble in water. Its acid solutions color woollens a handsome grayish blue.

If, instead of anilina, muriate of anilina is heated with the nitrate, fuchsin is produced, together with but a minimum quantity of a blue body insoluble in water. To prepare fuchsin the author recommends the following procedure:

One part of anilina is saturated with nitric acid, and ten parts of the same anilina are saturated with muriatic acid. The two (neutral?) liquids are then mixed and heated. At first the mixture becomes blue, and gives off watery vapor irregularly; but gradually the liquid will boil regularly, and heavy, white, inflammable vapor is given off, and after a time the mass acquires metallic lustre. When this mass is

treated with water the fuchsin is dissolved, and the blue coloring matter remains. Ph. Centralh., No. 6, 1875, p. 41; Polyt. Centralbl.

*Sulphate of Anilina.*—B. Jegel has studied the reaction of oxidizing agents upon sulphate of anilin. By the action of peroxide of manganese upon solution of the sulphate, a solution of rosanilin is obtained, and the undissolved portion of the peroxide is mixed with a soft, black powder, which is soluble in alcohol, forming a deep brownish violet solution, with which wool or cotton may be dyed brownish-black. The solution yields the rosanilin as chloride, when common salt is added to it. By the action of peroxide of lead upon aqueous solution of sulphate of anilina fuchsin is produced, and may be obtained by evaporating the filtered solution. The sulphate of lead formed retains a small proportion of the abovenamed violet coloring matter. This method is of special importance for the production of fuchsin, since a comparatively moderate temperature is required for the reaction, and the fuchsin is obtained pure by simple concentration of the solution. By the action of other oxidizing agents the author also obtained a black-green coloring matter. It is produced along with fuchsin by the action of perchloride of iron, sulphate of peroxide of iron, chromate of potassium, and chloride of copper, and by permanganate of potassium. Ferridcyanide of potassium produces a blue, soluble in alcohol. Nitrate of mercury produces fuchsin. In all instances the solutions are heated together at a boiling temperature. Ph. Centralh., No. 14, 1875, p. 113.

*Ferrocyanide of Anilin.*—Wehrlin prepares this salt in a state of purity with hydroferrocyanic acid, obtained by the action of tartaric acid upon yellow prussiate of potash. Anilin ferrocyanide forms thin, colorless laminæ, which gradually become yellow, and turn black on exposure to a higher temperature. It is neutral, and sparingly soluble in alcohol, ether, and in bisulphide of carbon; is soluble in cold, and more freely soluble in warm water. Schlumberger takes advantage of the sparing solubility of the ferrocyanide of

anilin in cold water, and prepares it as follows: 2 parts of hydrochloric acid at 19° B. and 2 parts of anilin are mixed, and added to a solution of 2.4 parts of ferrocyanide of potassium in 4.2 parts of boiling water, which latter solution has been allowed to cool down to 56° C. (— 132.8° F.), while the anilin solution must be quite cold. After a time ferrocyanide of anilin is deposited, and is filtered off from the solution of chloride of potassium. About 4.7 parts of the anilin compound is obtained, and is kept in the moist state, in which it will keep several days, for making

*Anilin black*, which is prepared by adding 10 per cent. of this salt to thickened chlorate of anilin. A similar method for making anilin black is proposed by A. Kielmayer: 5 parts of crystalline tartaric acid are dissolved in 10 parts of boiling water; 4 parts of chlorate of potassium are dissolved in 12 parts of boiling water; the solutions are mixed while hot, and 20 parts of cold water and 3 parts of anilin are added. The solution of *chlorate of anilin* so formed has a pale yellow color, and stands at 6½° B. A solution of hydroferrocyanic acid is obtained by treating 7 parts of ferrocyanide of potassium with 3 parts of sulphuric acid, diluted with 14 parts of water. After some days the yellow color disappears, and sulphate of potassium deposits. To 100 parts of solution of hydroferrocyanic acid, 128 parts of water and 20 parts of anilin are added. For steam anilin black take 34 parts of the solution of the chlorate of anilin; 12 parts of the solution of ferrocyanide of anilin; 34 parts of water; 12 parts of gum tragacanth mucilage, containing 128 grams to the litre.

*Ferricyanide of anilin* is also used for producing anilin black. It is much more soluble in cold water, and, according to Wehrlin, is soluble in alcohol, slightly soluble in ether, and in bisulphide of carbon, and forms deep-violet laminæ. Ch. News, April 16th, 1875; Bull. Soc. Chim. de Paris, Jan. 20th, 1875.

*Safranin* in substance may be distinguished from magenta by placing a few particles on a watch-glass, and adding about six drops of concentrated sulphuric acid. The salts of rosanilin dissolve with a brownish-yellow color, whilst the solu-



tion of safranin is at first green, and subsequently blue. Ch. News, July 24th, 1874; from Reimann's Färber Zeitung.

*Leukanilin* —A. W. Hoffmann has observed that when a colorless alcoholic solution of leukanilin is kept in contact with a little finely-powdered animal charcoal, the solution, which under ordinary circumstances remains colorless, acquires a red color, and is therefore reconverted into rosanilin, doubtless by the action of the oxygen contained in the pores of the charcoal. Ph. Centralhalle, No. 42, 1874, p. 346.

*Chrysenia* (chrysenin).—Mr. T. L. Phipson has extracted from crude chrysen a new solid base, which he calls *chrysenin*: Chrysen is treated with warm water, acidulated with hydrochloric acid, the mixture being well stirred for some time. The acid solution is decanted from the insoluble portion, filtered, and precipitated with ammonia. The brick-red precipitate, containing, besides chrysenia, more or less of quinalina and other bases, is converted into sulphate and reprecipitated, the operation being repeated once or twice. Finally, the concentrated aqueous solution of the sulphate, which is dark orange with a red fluorescence, is exposed to sunlight for a few weeks, when a certain quantity of a dark sediment forms, and the solution loses its red fluorescence. From the clear solution ammonia precipitates chrysenia in a much purer form, as a bright yellow flocculent substance, which is strongly alkaline, has a hot pungent taste, is soluble in alcohol, and is volatilized by heat, producing an irritant vapor, which, with hydrochloric acid, forms dense fumes. The author had already extracted it in 1872, but now first makes known its existence. Chem. News, August 14th, 1874, p. 69.

*Propylamina and Trimethylamina*.—Schering states that the propylamina of commerce, as obtained from herring brine, is really a solution of trimethylamina, containing about 10 per cent. of the base and a few per cent. of ammonia. True propylamina, while having the same composition as trimethylamina, is nevertheless not identical, the difference being principally in their boiling-points, which for trimethylamina is  $+8^{\circ}$  C. ( $-46.4^{\circ}$  F.); whereas propylamina boils at  $+50^{\circ}$  C. ( $-122^{\circ}$



F.). Commercial propylamina must yield, upon gentle heating, combustible gases, but not after neutralizing it with HCl. To determine the quantity of trimethylamina it contains, it is neutralized with muriatic acid, evaporated to dryness by gentle heat, and the dry mass is dissolved in absolute alcohol, which dissolves the muriate of trimethylamina, and leaves it pure upon evaporation; in this trimethylamina may be identified. Pharm. Zeit., No. 22, 1875, p. 174.

*Trimethylamina*.—The attention of Mr. T. B. Groves had been attracted to a peculiar ammoniacal flavor acquired by some “skate” (*Raia Batis*), which he had attempted to cure in the manner of preserving Finnan haddocks. He made some experiments which resulted in the production of *trimethylamina* in such quantities as to render the fish available for its production. Two skate, weighing together about eleven pounds, were kept for several days, until they had acquired the peculiar odor referred to. They were then cut up and distilled, with a little water and about six ounces of washing soda, in a copper still by the aid of direct steam. The distillate was neutralized with hydrochloric acid, evaporated to one pint, and, containing copper carried over from the still, this was removed with sulphuretted hydrogen; the solution was then further reduced in volume, redistilled with caustic soda, and the vapor condensed in hydrochloric acid. The solution was evaporated to dryness, and the dry mass treated with rectified spirit, to which it yielded six drachms of muriate of trimethylamina, while about double that quantity of muriate of ammonia remained undissolved. Proc. Br. Ph. Conf., 1874, p. 637.

*Trimethylamin*.—W. H. Spencer, in a treatise on the treatment of rheumatism and gout with trimethylamin, reviews the chemical history of this substance. He concludes that what is now used in medicine under the name of propylamin is really a solution of trimethylamin, and that no chemically pure trimethylamin has yet been used in medicine. The commercial trimethylamin (propylamin so called) is chiefly obtained by the distillation of herring brine with potash or

lime, and subsequent more or less repeated rectification. The process has, within the past two years, been much improved, and a product, containing 20 per cent. of trimethylamin, is now obtainable, prepared by the following process: The brine is distilled with soda-lime or potash, and the product condensed. The alkaline distillate is treated with hydrochloric acid, evaporated, dissolved in alcohol, the alcoholic filtrate evaporated, and the residue distilled with an alkali or lime into water, so as to form a 20 per cent. solution. This solution is usually sold as "propylamin." *The Practitioner* (Lond.), February, 1875, pp. 92-93.

*Protamina*, a new organic base, has been found by F. Miescher in the seminal filaments of the Rhine salmon. It is composed of  $C_9H_{21}N_5O_3$  ( $O = 16$ ). It is associated in the filaments with lecithin, cholesterin, fat, albuminoids, and nuclein, the latter an albuminoid free from sulphur. *Ch. News*, June 26th, 1874; from *Ber. d. D. Ch. Ges.*

*Creatin*.—The following reactions of creatin are noted by R. Engel in *Compt. Rend.*, June, 1874: The nitrate and ammonio-nitrate of silver are without action upon solutions of creatin. But if into a solution of creatin in excess nitrate of silver is poured, and then a little potassa, a white precipitate, soluble in excess of potassa, is obtained, and after a short time the liquid becomes a gelatinous mass. If the nitrate of silver is used in excess, an olive-colored precipitate of oxide of silver merely is obtained. An analogous compound of creatin with oxide of mercury has also been obtained by the author. If to a solution of creatin, containing an excess of potassa, corrosive sublimate solution is added drop by drop, a white precipitate is thrown down until all the creatin is precipitated, when further addition of corrosive sublimate causes precipitation of yellow oxide of mercury. *Ch. News*, August 7th, 1874, p. 64.

*Septicin*.—According to Hager this interesting organic base, which seems to be a product of the putrefaction of animal matter, was first observed by Marquardt. The latter observed a substance resembling, but distinct from conia, on two occa-

sions (1865 and 1868), and on the last occasion submitted some liquids containing it to Prof. Sonnenschein, who, however, failed to find any alkaloidal principle. In 1869, it seems Zuelzer and Sonnenschein made some preliminary statements regarding their discovery of an alkaloid in putrid liquids, and, apparently, ignored Marquardt's observation completely, for which reason Hager draws attention to the priority claim of Marquardt.

Schwanert has since had opportunity to observe this interesting substance. During an examination of the intestines, liver, and spleen of a child which had died suddenly, his attention was directed to a liquid and volatile basic body, which was remarkable for its peculiar odor. He had obtained it in very small quantity by Stas-Otto's method for extracting alkaloids, but it was insufficient for the purposes of accurate experiments. He thereupon secured larger quantities in the same organs of a human cadaver, which had been kept for sixteen days at a temperature of 30° C. (= 86° F.), and isolated from this, by Stas-Otto's method, a quantity of the base sufficient for his experiments. As obtained, it was a yellowish oily fluid, possessing an odor which reminded of propylamina, and an unpleasant but not bitter taste. It is volatile at ordinary temperatures, rapidly when heated, and strongly blues red litmus. It forms a crystalline compound with muriatic acid, and this compound dissolves in concentrated sulphuric acid, forming a colorless solution which gradually changes to brown-yellow, and upon heating becomes grayish-brown; in nitric acid it dissolves with a yellow color. It is precipitated from its alcoholic solution by bichloride of platinum; the crystalline compound produced containing 31.35 per cent. of platinum. The solution of its muriate is likewise precipitated by chloride of gold, chloride of mercury, iodinized iodide of potassium, iodohydrargyrate of potassium, and phosphomolybdate of sodium; the latter precipitate being yellow, and changed to blue by ammonia. Ph. Centralhalle, 1874, No. 52, p. 425.

Ad. Dupré has observed this body in 1866. His observations are in the main as those above referred to, but he finds

its most characteristic property to be the blue fluorescence of its solutions, especially that of its sulphate, which is similar to that of sulphate of quinia. The author names this body *animal chinoidin*. Ph. Centralhalle, No. 10, 1875, p. 73.

Dr. Oldekop, of Astrachan, communicates to Dr. Hager, that a body similar to septicin had been isolated by Lieven-thal in 1873, who had likewise supposed it to be conia, but upon closer examination found it to be distinct from this. Experiments made by Dr. Oldekop seem to point to the identity of septicin with the poison of decaying fish. He had been engaged in 1871 to examine into the hygienic condition of the Archangel fisheries, and to determine under what conditions the products of the fisheries are injurious to health. A number of poisoning cases had occurred, the patients suffering with symptoms of paralysis after eating the fish or after inhaling poisonous gases when cleaning the fish-tanks. He selected a piece of a putrid sturgeon, and digesting it in alcohol of 87 per cent., obtained a solution which possessed an odor reminding of propylamina, and yielded on spontaneous evaporation in a cold room a small quantity of an oily, colorless liquid. This possessed a peculiar penetrating odor, and seemed to possess highly poisonous properties in the fresh state. Upon keeping it, however, it became turbid, and, judging from experiments on dogs, it had lost its poisonous qualities. While in the fresh state, the author's wife incautiously inhaled some of the substance, and was, in consequence, immediately prostrated similarly to a paralytic stroke. Paralytic symptoms continued for several days. Ph. Centralhalle, No. 8, 1875, p. 57.

#### GLUCOSIDES AND ALLIED PROXIMATE PRINCIPLES.

*Test for Glucosides.*—Brunner had recommended as a test for glucosides that they be decomposed by sulphuric acid, and then treated with a little inspissated gall, which produces a magnificent red color (see Proceedings, 1874, p. 278). E. Almquist has since then experimented, with a view to determining the value of the application, operating as follows: Crystallized gall was dissolved in alcohol, and brought to a

strength of 1.5 per cent. of gall. A drop of this solution was placed in a porcelain capsule, the alcohol evaporated, 8 drops of 10 per cent. sulphuric acid added, then a small quantity of the substance to be tested, and heat carefully applied, until the reaction set in. By this method he found that, besides sugar and several glucosides in his possession, the following substances produced the reaction: Dextrin, starch, paper, linen fibre, woody particles, etc. The author therefore concludes that the reaction is only reliable when the perfect purity of the substance has been previously determined, a circumstance which makes the value of the reaction very questionable. Various alkaloids, inosit, tartaric acid, oxalic acid, etc., tested by the author, did not give the reaction. Arch. Pharm., Dec. 1874, p. 515.

*Amygdalin*.—Edward Lehmann has isolated the amygdalin from cherry, plum, peach, and apple-kernels, from the leaves of the cherry-laurel, and from the bark of *Rhamnus frangula*, with a view to determine the amygdalins so obtained with the amygdalin from bitter almonds. In his very comprehensive paper the author reviews the various methods of preparing amygdalin both in the crystalline and amorphous condition. He finds the method of Liebig and Woehler the best for obtaining the crystalline amygdalin when the fixed oil is first removed by means of petroleum benzin. The method consists in boiling the substance with strong alcohol (94 to 95 per cent.) twice successively, concentrating to about one-half or one-sixth of its volume, and adding ether, which precipitates the amygdalin, and serves the purpose of removing any fixed oil still adhering. The precipitated amygdalin is recrystallized from absolute alcohol. The author lays special stress on the complete exhaustion of the fixed oil from the substance, and the use of very strong alcohol to exhaust, thereby taking up, along with the amygdalin, only a minimum of sugar. From *bitter almonds* he obtained 2.5 per cent.; from *cherry-kernels*, 0.82 per cent.; from *plum-kernels*, 0.96 per cent.; from *apple-seeds*, 0.60 per cent.; from *peach-kernels*, 2.35 per cent. of well-crystallized amygdalin. From the *cherry-laurel leaves* and the bark of *Rhamnus frangula* he obtained respec-

tively 1.38 per cent. and 0.7 per cent. *amorphous* amygdalin, and he was unable to obtain either in a perfectly dry condition. During the preparation of amygdalin from the two last-named sources he observed the alcoholic distillate possessed an odor resembling but not identical with oil of bitter almonds. With delicate reagents he proved the presence of hydrocyanic acid, which substantiates the assertion, previously made by Winkler and Simon, that these substances contained hydrocyanic acid ready formed.

The amygdalin obtained by the author from cherry, plum, apple, and peach-kernels was found by the author to possess identical properties with the bitter almond amygdalin; possessing the same crystalline form, the same melting-point, the same relation to solvents, and the same behavior to reagents. With the exception of amygdalin from peach-kernels, which was not obtained in sufficient quantities to subject to ultimate analysis, they were found to contain  $C_{40}H_{37}NO_{23}$ , corresponding to anhydrous amygdalin. The cherry-kernel amygdalin of O. Michelson, which has the formula  $C_{30}H_{23}NO_{12}$  ( $O = 16$ ), evidently is a hydrate containing one equivalent more of water.

The *amorphous amygdalin* of the cherry-laurel leaves and the buckthorn bark was obtained by the author by Simon's method, slightly modified. It is more readily obtained pure from the dried than from the recent buckthorn bark. A tincture is made by boiling the substance with absolute alcohol (Simon used cold ordinary alcohol), which is then agitated with oxide of lead, and evaporated to dryness. The *amorphous amygdalins*, as obtained from the two sources, are so near alike that the author considers them identical. *Amorphous amygdalin* cannot be perfectly decolorized with animal charcoal. When dried under the receiver of an air-pump over sulphuric acid, it forms a brittle, light-yellow, transparent, resin-like mass, which, when heated to  $100^{\circ} C.$  ( $- 212^{\circ} F.$ ) becomes dark-brown. When dissolved in boiling alcohol and precipitated with ether, it separates in the form of a flaky mass, which, under the microscope, has the appearance of non-crystalline granules. It is exceedingly hygroscopic, and

cannot be completely deprived of water. Its taste is peculiar, strongly and purely bitter like salicin; it is odorless, soluble in water in all proportions, sparingly soluble in cold alcohol, freely soluble in boiling alcohol, and insoluble in ether. Subjected to dialysis it proves to be a crystalloid, notwithstanding that it has not yet been obtained in other than the amorphous form. As obtained in various conditions of dryness, its formula corresponds to the formula for one equivalent of amygdalin, one equivalent of amygdalinic acid, and water. Its characters are, however, so distinct from the crystalline amygdalin that the author is not prepared to regard it a compound of amygdalinic acid and amygdalin, but proposes to name it *Laurocerasin*.

The author, in connection with his experiments, has observed that the substances containing crystalline amygdalin always contain crystallizable cane-sugar, whereas those containing the amorphous amygdalin contain only glucose, and that in small quantity. The former also contain large percentage of fixed oil, whereas the latter contain but small quantities of fatty substances. N. Rep. Ph., Nos. 8 and 9, 1874, pp. 449-481.

*Phloridzin*.—H. Schiff has improved the methods, heretofore in use, for preparing some of the decomposition products of phloridzin, among which are phloretin, phloretic acid, phloroglucin, etc.

*Phloretin*.—The usual method of obtaining phloretin is that originally recommended by Stas and by Roser, which consists in boiling phloridzin for a long time (four days) with dilute acids. The author has found that when 20 grams of phloridzin is dissolved in 140 grams of boiling water, 50 grams of nearly boiling sulphuric acid of 20 per cent. is added, and the mixture is then boiled for a few minutes, a crystalline magma is formed, consisting of perfectly colorless phloretin. After cooling the magma is collected upon a vacuum filter, and washed with water. The rapid conversion of phloridzin into phloretin affords a very convenient lecture experiment.

*Phloretic Acid*.—Hlasiwetz, who had first obtained it by the action of caustic alkalies, recommended that 200 c.c. of



potassa solution, of specific gravity 1.25, and 15 grams of phloretin be evaporated to a magma, etc. The product by this method becomes highly colored, and the process is tedious. Shift finds the following method preferable: 20 grams of phloretin is boiled for about three hours with 150 grams of solution of potassa, of 1.20 sp. gr., in a flask, provided with a reversed condenser. Upon cooling the liquid is introduced into a litre cylinder, it is accurately saturated with sulphuric acid, a slight excess of bicarbonate of sodium is added, and extracted repeatedly by agitation with an equal volume of ether. By this treatment

*Phloroglucin* is extracted, and may be obtained perfectly pure upon the evaporation of the ethereal solution. The aqueous residue remaining in the cylinder, after treatment with ether, is acidified with sulphuric acid, and again shaken with ether, which removes now the phloretic acid, and leaves it on evaporation slightly contaminated with phloroglucin.

*Phloroglucid* may be readily obtained from phloroglucin by heating with oxychloride of phosphorus for several hours, then distilling off the excess of the latter, and treating the latter with water, then with alcohol, and it is finally washed with ether, as long as it becomes colored, when it remains in the form of crystalline scales.

*Triphloretid* is obtained by the author, by a similar method, by acting upon phloretic acid with oxychloride of phosphorus. It is purified by washing with water, and with alcohol, and finally dissolving it in boiling glacial acetic acid, which upon cooling deposits it in the form of crystalline scales, from which the adhering acetic acid is removed by washing with water and with alcohol. Glacial acetic acid seems to be the only solvent for this substance. By heating it with caustic potassa it is reconverted into phloretic acid. Its composition corresponds to the formula  $C_{27}H_{28}O_7$  ( $O=16$ ). Ch. Centralbl., No. 30, 1874, p. 469; from Am. Ch. Ph., 1874.

*Arbutin*.—The experiments of Hlasiwetz and Habermann determine that this glucoside, when treated with acids or ferments, yields besides sugar and hydrochinon also a crys-



tallizable compound, which has heretofore escaped notice, and which they recognize as methyl-hydrochinon. Wien. Akad. Ber., No. 9, 1875, p. 73.

*Digitalin*.—Nativelle has given the following improved method on his process, published some years ago, for preparing crystallized digitalin. Finely powdered digitalis leaves, 1000.0 grams; neutral acetate of lead, 250.0 grams; distilled or rain water, 1000.0 grams. The lead salt is dissolved in the water, the powdered leaves are added and stirred occasionally for twenty-four hours. The mixture is then introduced into a percolator, and percolated with alcohol of 50 per cent., until the percolate passing is no longer bitter. To the mixed percolate a saturated solution of 40 grams of bicarbonate of sodium is then added, and, after effervescence ceases, the alcohol is distilled off, and the residue is evaporated on a water-bath to 2000.0 grams; it is then allowed to cool, diluted with an equal weight of water, allowed to stand a few days to settle, the clear liquid is decanted with a siphon, and the sediment collected on muslin and expressed. The sediment, which when expressed as much as is possible weighs about 100.0 grams, is mixed with 1000.0 grams of 80 per cent. alcohol, heated to boiling, 10.0 grams acetate of lead added, and again boiled a few minutes. The mixture is allowed to cool, filtered, the filter washed with a little alcohol, and the filtrate mixed with 50.0 grams powdered wood-charcoal, and distilled to remove the greater part of the alcohol. The remainder of the alcohol in the charcoal residue is then evaporated on a water-bath, the residue is then placed on a strainer to permit any adhering liquid to drain, and is dried. It is then placed in a percolator and percolated with chloroform until the percolate passes colorless.\*

Upon the evaporation of the chloroformic solution the crude digitalin, mixed with a pitchlike mass and fat, is obtained.

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\* The residue contains *digitin*. To obtain this the chloroform is dissipated, it is exhausted with boiling 80 per cent. alcohol, filtered, the residue washed, the filtrate distilled to one-half, and allowed to crystallize. The crystals are further purified by animal charcoal, and then have the appearance of handsome, white, pearly-glistening needles, and are tasteless.

This is dissolved in 100 grams of 90 per cent. alcohol by the aid of heat; 1 gram of acetate of lead dissolved in the smallest possible quantity of water, and 10 grams of purified animal charcoal in the form of fine grains,\* is added, and the mixture is heated to boiling for ten minutes, is then allowed to cool, to settle, is filtered, and the alcohol distilled off. The residue, which consists of granular crystalline digitalin, contaminated with a little oil and water, is drained, 10 grams of 90 per cent. alcohol is added, followed by 5 grams of ether, and then by 15 grams distilled water, after which it is shaken. Two layers form upon standing, the upper, containing the fixed oil, being decanted, while the lower deposits crystalline digitalin, which is washed with a little ether to remove the rest of the coloring matter.

To obtain it perfectly white it is powdered very fine,† redissolved in chloroform to separate the last traces of digitin, and is then treated with alcohol and animal charcoal, and the evaporated and dried filtrate with alcohol, ether, and water, as above described. If the crystals are not completely colorless, they must be recrystallized from alcoholic solution which has been treated with a little animal charcoal. Ph. Centralhalle, No. 47, 1874, p. 388; from Schweiz. Wochenschr.

*Digitalin*.—From the experiments of C. Kosmann it would appear that the crystallized digitalin of Homolle and Nativelle, is a product which has already undergone partial alteration by the multiplicity of the manipulations. According to this author there exists in the *Digitalis purpurea* an immediate principle which has been successively named digitalin, digitosolin, and digitalretin. This substance is soluble in water; it is very hygroscopic, and also readily altered by the action of water, acids, and alkalies. It exists in the plant in the soluble state, and is in this state composed of one molecule of digitalretin and two molecules of glucose; but even in the plant it is partially altered by aqueous, saline, or acid constituents,

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\* The fine powder of the charcoal must be sifted off, because it impedes the filtration.

† The trituration must be conducted very cautiously, to prevent the inhalation of dusty particles of the digitalin.

and is partly decomposed into insoluble digitalin, which consists of one molecule of digitalretin, and one molecule of glucose. This is the reason why insoluble digitalin is always obtained from the plant together with the soluble; the former, however, not being entirely insoluble, but much less soluble in water than the latter. Both the soluble and the insoluble digitalin are very bitter and very energetic in the animal economy. The first is especially manufactured in Germany, the second in France. By the action of dilute hydrochloric or sulphuric acid the *soluble digitalin* is split up into one molecule of glucose and one molecule of *insoluble digitalin*; this, upon the further action of the acid, is split up into one molecule of glucose and one molecule of *digitalretin*, which has also been called *paradigitaletin*; by the prolonged action of acid the digitalretin is ultimately decomposed into *dehydrated digitalretin* and four molecules of water. The composition of *soluble digitalin* =  $C_{54}H_{45}O_{30}$ ; of *insoluble digitalin* =  $C_{42}H_{33}O_{18}$ ; of *digitalretin* =  $C_{30}H_{25}O_{10}$ ; of *dehydrated digitalretin* =  $C_{30}H_{21}O_6$ . Comparing the composition of Homolle and Nativelle's crystallized digitalin with the soluble digitalin of the author, the former would be intermediate in composition between digitalin and digitalretin; a mixture of one molecule of insoluble digitalin and two molecules of digitalretin having a centesimal composition closely approaching that of the crystallized digitalin.

The German process consists in treating the dried and powdered leaves twice successively with eight times their weight of alcohol of 80°, distilling off the greater part of the alcohol, filtering the residue, treating filtrate with triplumbic acetate, filtrating again, and treating filtrate with sulphuretted hydrogen. The liquid is again filtered, precipitated with tannin, the precipitate washed upon a filter with water, dissolved in alcohol, and triplumbic acetate of lead added, and the excess of lead removed from the filtrate by sulphuretted hydrogen. The filtrate is evaporated, washed with ether, then dissolved in alcohol, evaporated and dissolved in water. This leaves the insoluble digitalin, while the solution of soluble digitalin is further purified by treatment with animal char-

coal, or preferably by reprecipitation with tannin and treatment of the tannate of digitalin as before. So obtained, the digitalin possesses a high degree of purity and is extremely energetic. The yield is 0.623 per cent. of soluble, and 0.167 of insoluble digitalin. Ph. Jour. Trans., Jan. 9th, 1875, p. 545; from J. de Ph. et de Chim.

*Active Principles of Digitalis.*—Prof. Schmiedeberg, of Strasburg, has prepared a new, well-defined, crystallizable principle, from the leaves of *Digitalis purpurea*, which he has named

*Digitoxin.*—It is prepared by a process similar to that of Nativelle for “digitalin,” in which, in fact, *digitoxin*, as well as *paradigitogenin* (of Schmiedeberg), are largely found. The dried leaves are completely exhausted with water, and they are then repeatedly extracted by dilute alcohol, 50 per cent.; the tincture so obtained is precipitated with basic acetate of lead, the precipitate is separated, the filtrate is concentrated, and the deposit, formed after some days, removed and washed with dilute solution of carbonate of sodium, by which a yellow matter (chrysophan?) is partly removed. The substance is then dried, treated with chloroform, the chloroform evaporated, and the brownish mass so obtained is treated with benzin, which dissolves the remainder of the yellow matter and a little fat. It is finally purified by recrystallization from warm alcohol of 80 per cent. and the use of a little charcoal, washing the yellowish crystals with a little benzin, and crystallizing from warm absolute alcohol containing a little chloroform. Colorless crystals are obtained in this way provided the digitoxin is allowed to separate by the cooling of the solution, and not by the evaporation of the solvent. So obtained digitoxin is in the form of perfectly colorless scales or needle-shaped crystals, the yield being about *one* part from *ten thousand* parts of the dried leaves, and it is so highly poisonous that the author thinks it not at all fit for medicinal use. It is insoluble in water, to which it does not even impart its intensely bitter taste, as displayed in alcoholic solution, in benzin, and in bisulphide of carbon; sparingly in ether, and more abundantly in chloroform; freely soluble in alcohol, cold or warm. Its composition corresponds to the

formula  $C_{31}H_{53}O_7$ . It is not a glucoside, but is very prone to decomposition by acids, either dilute or strong; hence all liquids or precipitates resulting during its preparation must be carefully kept neutral. Warmed with concentrated hydrochloric acid, it assumes the yellow or greenish hue commonly attributed to commercial digitalin. Decomposed by dilute acids in alcoholic solution an uncrystallizable yellowish substance

*Toxiresin* is produced, which is easily separated on account of its solubility in ether; it appears to be produced also if digitoxin is maintained for some time in a state of fusion at about  $240^{\circ} C.$  ( $= 464^{\circ} F.$ ).

*Digitalin* is made by Henn and Kittler, of Strasburg, in large quantities from seeds, and such digitalin has furnished Schmiedeberg the material for further researches. He obtained from commercial digitalin directly three distinct substances, viz, *digitonin*, *digitalin*, and *digitalëin*. By artificial means he obtained from the

*Digitonin* four other substances, which will be enumerated below. Digitonin may be obtained by moistening commercial digitalin with absolute alcohol, and then treating with a mixture of equal volumes of alcohol and chloroform, by which the greater part of the digitalin is dissolved. Upon the addition of ether to the filtered solution the digitonin is deposited, and may be purified by solution in warm alcohol, treatment with animal charcoal, and reprecipitation with ether. Digitonin is very closely allied to "saponin," and, like it, its aqueous solution is characterized by frothing. Its formula is  $C_{31}H_{52}O_{17}$ ; Rochleder's saponin having the formula of  $C_{32}H_{54}O_{18}$ . Unlike saponin digitonin turns red by boiling with dilute sulphuric acid, and the solution then deposits a flocculent matter composed of

(a) *Digitoresin*, and (b) *Digitonëin*, both of which are glucosides, requiring further examination. The digitoresin may be removed by ether, and the digitonëin then obtained in white tufts, devoid of crystalline structure, by solution in alcohol containing chloroform, and precipitation by ether. The product into which digitonëin is split by dilute acids,

yields, with concentrated sulphuric acid, a brown liquid, displaying in sunshine a magnificent green fluorescence. If the alcoholic solution of either digitoresin or digitonëin is boiled for a day or two with dilute sulphuric acid

(c) *Digitogenin*, a crystallizable substance, is obtained, when the yellow residue, remaining after the evaporation of the alcohol, is washed with water and crystallized from hot alcohol. It crystallizes in long, colorless needles, is abundantly soluble in chloroform, but little in ether. By cold concentrated sulphuric acid it is not affected, but turns yellow by warming, and then displays the same green fluorescence as the abovementioned derivative of digitonëin. The fourth artificial product obtained by the author from digitonin,

(d) *Paradigitogenin*, is obtained by subjecting a solution of digitonin to slow fermentation, when it is deposited, and may be extracted by chloroform. It is crystallizable, and very closely allied to digitogenin, and agrees, perhaps, with the "digitalose" of Homolle and Quevenne. Unlike digitogenin it assumes a brown hue with cold concentrated sulphuric acid.

*Digitalin* (Schmiedeberg's).—This was obtained by the author by acting upon "commercial digitalin" (from seeds) with a mixture of one volume of ether and three of alcohol, adding a small quantity of water, distilling off the ether, adding more water to the residual solution, and then concentrating by gently warming, when a flocculent, whitish or yellowish mass of "Schmiedeberg's digitalin" is deposited, while *digitalëin* remains in solution. The crude digitalin is washed with dilute carbonate of sodium solution to remove the yellow matter (*chrysophan*?) contaminating it, then it is washed with chloroform, and dissolved in warm dilute alcohol, from which, in a few days, it separates upon cooling, forming small, soft, colorless grains, agreeing in composition with the formula  $C_5H_8O_2$ . It is soluble in alcohol, alcohol containing chloroform, and in dilute acetic acid; whereas it is sparingly dissolved by ether or chloroform, and still less by water, even when boiling. This well-defined "digitalin" possesses in a high degree the action of foxglove on the heart,

and is the prominent constituent of several kinds of "commercial digitalin," especially that of Homolle and Quevenne. It is a glucoside, capable of being split by the action of acids into glucose and

(a) *Digitaliresin*, which, like the mother-substance, is a powerful poison. This is capable of being again split into sugar and another derivative, not yet thoroughly examined, but devoid of any active virtue, and is, on the whole, very nearly allied to digitoresin.

*Digitalëin*.—It has been observed that the liquid, remaining after Schmiedeberg's digitalin has deposited, contains digitalëin. To obtain this the liquid is evaporated in vacuo, the residue dried over sulphuric acid, dissolved in absolute alcohol, and a little ether added. Impure digitalëin separates, and is removed, and upon the further addition of ether to the clear liquid pure digitalëin is precipitated. This process of solution and precipitation is repeated, until the precipitate no longer turns red with boiling hydrochloric acid, but only yellowish. Nevertheless, the author has not succeeded to obtain it free from a yellowish hue. While in many respects digitalëin agrees with the author's digitalin, it differs from this, being freely soluble in water, and forming, like digitonin, a frothing solution, and from digitonin by being readily soluble in absolute alcohol. Ph. Jour. Trans., March 20th, 1875, p. 741; from Arch. f. Exp. Pathol. and Pharmacol.

*Saponin*.—J. Christophsohn has made comprehensive researches on the saponins of *quillaya bark*, of the root of *Gypsophila struthium*, of the root of *Saponaria officinalis*, and of the seeds of *Agrostemma githago*, and finds them to be identical in their composition, and that by dilute acids they are split into sapogenin and glucose in the same relative proportions. The formula of Rochleder,  $C_{64}H_{106}O_{36}$ , is doubtful, and the difference existing in the formulas of various authors must be attributed to a want of purity of the saponin. The author does not give a formula, but states the result of his numerous analyses of the four saponins to be C54.4215, H8.3150, and O37.2635 per cent. He gives the methods by which he ob-



tained his saponin, its properties, decomposition, reactions, physiological action, and its quantitative determination in the drugs from which it is obtainable, but enters so much into detail that these points can only be alluded to in this report. Some experiments made with

*Senegin* seem to indicate that this principle, as is believed by Buchholz, Pfaff, Bolley, etc., is identical with the saponins obtained by the author. His material, however, was insufficient to make an elementary analysis. Arch. Ph., May and June, 1875.

A substance analogous to *Saponin* has been isolated by F. A. Harsten from the leaves of the common ivy (*Hedera Helix*). The finely-chopped leaves are brought to the condition of a magma with alcohol of 85–90°, and allowed to macerate for twenty-four hours, expressed, and the filtrate distilled, until the residue in the retort begins to froth. Upon cooling a flocculent precipitate, or even a magma, is formed, which is digested with cold water and filtered, by which chlorophyll and fatty matter, together with the substance in question, is separated. To purify this, the residue on the filter is washed with water, dried, dissolved in boiling alcohol, and allowed to evaporate spontaneously, when a granular mass is obtained. Chlorophyll and fat are removed by drying the granular mass and washing with benzin (benzol). Finally, it is again washed with water, and recrystallized from alcoholic solution, with treatment by animal charcoal. So obtained, the new substance is a light powder, composed of microscopic scales, with difficulty soluble in water, but imparts to it the property of frothing; also sparingly soluble in ether and benzin (benzol), but readily dissolved by boiling alcohol. The author distinguishes it from saponin by its sparing solubility in water. It is peculiar in its relation to alkalies, with which it is apparently saponified (?), and precipitated from its alkaline solution by common salt. When boiled with dilute sulphuric acid, 33 to 38 per cent. of the substance is converted into sugar; but, as simple heating with water extracts 15.5 per cent. of sugar, it is possibly a mixture of sugar and of a bitter principle. The substance remaining, after the extrac-



tion of the sugar by warm water, is readily obtained in crystalline leaflets. Arch. Pharm., April, 1875, p. 299.

*Artificial Vanillin from Coniferin.*—This beautiful crystalline glucoside, which was discovered by Hartig in the sap of the cambium of coniferous trees, has been found, by Ferd. Tiemann and Wilh. Haarman, to yield an aromatic principle which proved to possess the odor and taste, and to be in fact identical with vanillin. When coniferin is submitted to fermentation with emulsin, it is split into glucose and a splendid, prismatic, crystalline compound, which is easily soluble in ether, less so in alcohol, and almost insoluble in water, its composition being  $C_{10}H_{12}O_3$  ( $O = 16$ ). When this product of fermentation is distilled with a mixture of bichromate of potassium and sulphuric acid, there passes first ethylic aldehyde, and, subsequently, an acid compound soluble in water, from which it is removed by ether. On evaporating the ethereal solution, crystals are left behind, which were found, by accurate comparative examination, to be identical with the crystalline substance which constitutes the aroma of vanilla, and which is often seen covering the surface of vanilla pods. On analysis, the crystals were found to contain  $C_8H_8O_3$  ( $O = 16$ ), which is exactly the composition of vanillin as established by the recent researches of Carles. Moreover, the authors have produced with the artificial compound a series of salts and two substitution products, corresponding with those which had previously been prepared by Carles; and, by further comparative experiments, upon natural and artificial vanillin, prove the identity of their constitution. Chem. News, July 3d, 1874, p. 3.

*Gentianin.*—According to the recent investigations of Hlasiwetz and Habermann, the crystallized gentianin, also called gentisin, is very closely related to maclurin. By melting caustic potassa, it is very readily decomposed, forming an acid isomeric with protocatechuic acid, phloroglucin, and acetic acid. N. Rep. Ph., No. 10, 1874, p. 631.

*Santonin.*—Its preparation by the intervention of coal oil (see Hydrocarbons, in this report) has been carried out success-

fully by MM. Boiraux and Léger. One kilogram of whole semen contra is boiled for half an hour with 5 litres of water and 250 grams of hydrate of calcium (strictly  $\text{CaOH}$ ), strained and expressed, and the process is twice repeated with 3 litres of water and 150 grams of lime, and with 2 litres of water and 100 grams of lime respectively. The united products form a yellow, turbid liquid, which is acidified with sulphuric acid, allowed to stand twenty-four hours, the precipitate (weighing about 500 grams when dry) is collected on a strainer, dered. The powder is heated in a litre of coal  $10^{\circ}\text{C.}$  ( $= 176^{\circ}\text{F.}$ ), for half an hour, thrown and the undissolved portion washed with half a oil previously heated. The filtrate is heated bath with 20 grams of powdered animal black, completely decolorized in about a quarter of an en filtered, and upon cooling deposits colorless *Santonin*. The mother liquor may be made to yield the remainder of the product by concentration, but is best used in a subsequent operation. *Ph. Jour. Trans.*, Feb. 1875, p. 643; *Rép. de Pharm.*, ii, 377.

*Santonin*.—Several instances of adulterated santonin having been noted during the past few years, F. Hoffmann examined some of the santonins of the market, and, with a single exception, found them all pure. See *Proceedings*, 1874, p. 456.

*Cantharidin*.—Galippe recommends acetic ether in preference to chloroform for extracting cantharidin, and uses most advantageously a displacement apparatus. Two parts of the ether will readily extract all the cantharidin from 1 part of flies, especially if the operation is conducted at a temperature of about  $35^{\circ}\text{C.}$  ( $= 95^{\circ}\text{F.}$ ). The percolate, upon concentration, leaves a greenish crystalline mass, from which the adhering greenish matter is mechanically removed by means of bibulous paper, and the crystals are, finally, washed with bisulphide of carbon, and recrystallized from acetic ether, with the use of a little charcoal. *Zeitschr. Oest. Apoth. Ver.*, Feb. 10th, 1875, p. 83.

*Cantharidin* is very readily obtained in the form of pure white crystals by the following process of G. Boiraux and E. Léger: 500 grams of powdered cantharides are exhausted by percolation with repeated portions of 2 litres of coal oil (see Hydrocarbons, in this report), previously heated to boiling, as long as the percolate passes colored. The latter is then concentrated by distillation to 80 grams, the residue transferred to a capsule, and allowed to stand twenty-four hours. The greenish mass, interspersed with brilliant needles of cantharidin, is washed on a filter with bisulphide of carbon, which leaves the cantharidin in a pure state, the very slight trace of color remaining being removed on exposure to air for a few hours. The yield varies, according to the cantharides used, from 0.25 to 1.0 per cent. Experiments made prove that the extraction of fatty and coloring matters, along with the cantharidin, does not interfere with the yield of the latter. Ph. Jour. Trans., Feb. 1875, p. 662; Rép. de Pharm., ii, 377.

*Aloïn*.—V. Sommaruga and Egger have for some time been engaged in determining the constituents of aloes. The authors find that the aloïn of Socotrin aloes is not a glucoside, and differs from nataloïn and barbadaloïn. It melts at 118° to 120° C. (— 242.6° to 248° F.), *i. e.*, the mass of the aloïn becomes soft. Stenhouse had found its composition to correspond to the formula —  $C_{17}H_{18}O_7$  (O — 16); the authors find its composition to correspond to the formula —  $C_{15}H_{16}O_7$  (O — 16). The experiments of the authors incline them to assume that barbadaloïn, nataloïn, and socotraloïn are homologous in their constitution, corresponding respectively to the formulas  $C_{17}H_{20}O_7$ ,  $C_{16}H_{18}O_7$  and  $C_{15}H_{16}O_7$  (O — 16). Socotraloïn yields, upon treatment with nitric acid, oxalic and aloëtinic acids. Socotrin aloes yield, besides these, ~~aloë~~ *chrysaminic* acid, which the authors have obtained in a higher degree of purity than has hitherto been the case (see Organic Acids, in this report). Ph. Centralhalle, No. 33, 1874, p. 265.

*Elaterin*.—Mr. Frederick B. Power has prepared elaterin from a sample of Clutterbuck's elaterium, and has determined some of its reactions. The elaterium was exhausted with

boiling alcohol, the alcoholic extract, amounting to 60 per cent., was treated with warm dilute solution of potassa to remove resin, and was thus obtained in small crystalline crusts and grains. These were further purified by re-solution in boiling alcohol, and agitation of the solution with petroleum benzin, which retained tenaciously adhering green resin. Upon separation and evaporation of the alcoholic solution beautiful, colorless, needle-shaped crystals of elaterin were obtained. The author is inclined to believe that by the use of petroleum benzin the use of potassa can be entirely dispensed with. He suggests that under these conditions the elaterium should be first treated with water to remove inert substances. The author states that when elaterium is boiled for two hours with diluted sulphuric acid (1 part acid to 10 parts water), the elaterium is almost completely dissolved, a few resinous flocks only remaining, and the filtered solution gave evidence of glucose by the usual test. With elaterin, as obtained by him, he obtained no such results, and he therefore believes that pure elaterin is not a glucoside, and that in instances where a reduction of cupric oxide takes place it may be attributed to impurities in the elaterin. He found his elaterin to have the following reactions:

*Concentrated Sulphuric Acid.*—One drop in contact with a crystal of elaterin produces instantly a deep red color; the addition of a fragment of bichromate of potassium changes the color to a deep brown, and ultimately to a light green. By heating its solution in concentrated sulphuric acid it becomes carbonized.

*Hydrochloric Acid.*—Insoluble; not changed either cold or hot.

*Strong Nitric Acid.*—In the cold no change until after two hours, when a pink tint is produced; when it is heated with the acid a red coloration is soon produced, nitrous fumes are evolved, and upon the addition of water white flocks separate.

*Chlorinated alkalies* have no effect on it.

*Tannic acid* or *chloride of barium* do not precipitate its alcoholic solution.

When heated it melts, giving off white fumes, which are neutral to litmus, and burns with a smoky flame, leaving a garnet-colored resinous ash. A. J. Ph., Jan. 1875, p. 1.

*Ostruthin*.—V. Gorup-Besanez endeavored to obtain imperatorin (or peucedanin, with which it has been proven to be identical) from the recent root of *Imperatoris ostruthium* (Masterwort), but obtained a principle which was entirely distinct from the imperatorin of Osann and Wackenroder, and the peucedanin of Erdmann and Bothe. He, therefore, concluded that the principle, imperatorin, did not exist in masterwort root, and called the new principle *ostruthin*. The author seems to have been ignorant of the experiments made by R. Wagner in 1854, by which he demonstrates that the recent root does not contain imperatorin, which (seemingly) is formed in the dry root, and, in a note, he corrects his statements in regard to the non-existence of that principle.

*Ostruthin*, the existence of which in the masterwort root is not disputed, was obtained by v. Gorup-Besanez, by treating it with hot alcohol, evaporating the tincture, treating the extract with ether to which a little lignoïn had been added, filtering the ethereal solution, and adding lignoïn until the solution became quite turbid. An amorphous brown mass was deposited, from which the lighter colored liquid was decanted, and allowed to evaporate spontaneously. A copious formation of crystals resulted, which were, however, contaminated with a deep-yellow fixed oil. This oil was very difficult to remove, the author recrystallizing it repeatedly from alcoholic and ethereal solution. It was obtained perfectly pure, finally, by dissolving the crystals in very dilute solution of potassa, passing carbonic acid into the solution, collecting the white precipitate of *ostruthin*, expressing, dissolving in alcohol of 80 per cent., and adding to the alcoholic solution water until it became permanently turbid. After a time snow-white, silky-glistening, hair-fine needles were deposited, collected, and dried. From alcoholic or ethereal solution it is obtainable by spontaneous evaporation, in handsome colorless rhombic crystals. It is odorless and tasteless (even in alcoholic solution), insoluble in cold water, very

sparingly soluble in hot water, but freely soluble in alcohol, ether, and alkaline solutions. It is neutral to test-paper, and has a composition of  $C_{14}H_{17}O_2$  ( $O = 16$ ). Its alcoholic solution is extremely fluorescent, and the blue fluorescence produced in it, on the addition of a few drops of water, is comparable only with that of æsculin. N. Rep. Ph., Nos. 8 to 9, 1874, pp. 525 to 535.

*Herniarin*.—Gobley has obtained a crystalline principle, very closely resembling coumarin, from *Herniaria glabra*. The dried and powdered herb was exhausted in a percolator with alcohol at 85 per cent., the solution evaporated to syrupy consistence, shaken with ether, and the ethereal solution evaporated. The residue from the ethereal solution yielded the principle to hot water, from which it crystallized on cooling. By recrystallization, and the use of animal charcoal, it was obtained in short, colorless prisms, possessing the odor of the herb, and a sharp aromatic taste. It is neutral; melts at  $118^{\circ} C.$  ( $= 244.4^{\circ} F.$ ); is sparingly soluble in cold water, but freely soluble in hot water, in ether, and in alcohol. The author proposes to continue his studies upon this body. Zeitschr. Oest. Apoth. Ver., No. 35, 1874, p. 661.

*Kosin* (Koussin).—F. A. Flückiger and E. Buri have subjected some pure kosin (koussin), handsomely crystallized, to chemical investigation. They were unable to determine its crystalline form by the ordinary methods, but have determined them to belong to the rhombic system. Its specific gravity is so great that it sinks rapidly when placed in sulphuric acid of sp. gr. 1.482 at  $14^{\circ} C.$  ( $= 57.2^{\circ} F.$ ). The crystals are sulphur-yellow and form a white powder; possess neither odor nor taste; have no action on litmus-paper, moistened with water or alcohol; do not lose weight at  $100^{\circ} C.$  ( $= 212^{\circ} F.$ ) or when melted. The melting-point of kosin is near  $142^{\circ} C.$  ( $= 287.6^{\circ} F.$ ), and it remains perfectly transparent on cooling; when heated strongly it gives off the odor of butyric acid, and a red-brown tarry product is formed. It is almost completely insoluble in water, which acquires faint opalescence, but does not take up weighable quantities. It is

but sparingly soluble in cold alcohol or glacial acetic acid, the former taking up at 12° C. (= 53.6° F.) 0.23 per cent.; but in boiling alcohol it is freely soluble. It is also freely dissolved by ether, benzol, bisulphide of carbon, and chloroform. The authors' further experiments, which are incomplete, seem to indicate that kosin is an ether compound of iso-butylic acid. Its composition =  $C_{31}H_{38}O_{10}$  (O = 16). Arch. Ph., Sept. 1874, pp. 193-205.

#### COLORING MATTERS.

*Chlorophyll*.—Kraus, in his very elaborate and valuable treatise on the constituents of chlorophyll, had found that when an alcoholic solution of chlorophyll is shaken with benzol, the benzol dissolves a portion of a blue-green color, and the alcoholic solution retains a yellow constituent, which he had called xanthophyll. Believing chlorophyll to be produced by the admixture of the xanthophyll, and the blue-green substance, he proposed to call this latter "cyanophyll." Wiesner, while he regards the results of Kraus as highly important, considers that they do not justify him to call the substance dissolved by benzol cyanophyll, and contends that it is really pure chlorophyll, notwithstanding that compared with the original chlorophyll, it shows a tinge of blue. The author has found that chlorophyll (cyanophyll, Kraus) may also be abstracted from alcoholic solution and separated from xanthophyll by some fixed and volatile oils, such as linseed, nut, poppy, and olive oil, various terpins, oil of wintergreen, etc. Bisulphide of carbon also possesses this property. The chlorophyll extracted by these methods, as well as by benzol, possesses all the characteristics of the "crude" chlorophyll, the green color (modified by a blue tinge (?)), the red fluorescence, its relation to light, with access or exclusion of air, its behavior in the dark, etc. The author believes that by no method yet proposed or used, has the chlorophyll been obtained in a perfectly pure condition; that in its present forms it always contains more or less foreign matter; but that by the researches of Kraus the key to its isolation in a perfectly pure form, if this is possible at all, has been fur-



nished. Ph. Centralbl., No. 29, 1874, p. 454; from Flora, 1874.

*Chlorophyll*.—F. A. Harsten prepares pure chlorophyll as follows, using finely-chopped ivy leaves as the source. The leaves are beaten into a paste with spirit of 55°, and pressed after twelve hours. This removes water, a bitter substance (*helicin*), and a saponifiable compound. The pressed leaves are now soaked in benzin for twenty-four hours, and the benzin is removed from the expressed solution by distillation. The dark-brown fatty residue, amounting to 2½ per cent. of the leaves, is treated with a solution of soda, filtered, and precipitated by common salt. The precipitate, after being washed with a salt solution, is dissolved in water, and precipitated with a solution of sulphate of copper. This precipitate, after being washed and dried, is boiled with absolute alcohol, and then washed with ether and benzin; this treatment removes the copper soap, and leaves the compound of chlorophyll with oxide of copper. Finally, the latter is suspended in alcohol, and decomposed by sulphuretted hydrogen. On evaporating the solution the chlorophyll is left of a very dark-green color, almost black, and quite free from fatty matter. It is soluble in hydrochloric acid and in alcohol, yielding a solution of a very fine green color. Am. Jour. Ph., Sept. 1874, p. 426; from Jour. Ch. Society, 1874.

*Purpurin* has been obtained by synthesis, by F. de Lalande, by the oxidation of pure alizarin. To 8–10 parts of concentrated sulphuric acid 1 part of dry pulverized alizarin and 1 part of dry arsenic acid or peroxide of manganese is added. The mixture is gradually heated to 150–160° C. (= 302–320° F.), until a drop of it, added to feebly alkaline water, produces the red color of purpurin. The mass is then treated with a large quantity of water, the precipitate washed with cold water, dissolved in a sufficient quantity of saturated solution of alum, and reprecipitated by an acid. By again treating with alum and crystallizing out of superheated aqueous solution, the purpurin may be obtained perfectly pure. The analysis proved it to have the composition as well as all the



properties of natural purpurin. Ch. Centralbl., No. 42, 1874, p. 660; Compt. Rend., pp. 79-669.

*Artificial Alizarin.*—The patent of Graebe, Liebermann, and Caso is based upon the oxidation of anthracen to anthrachinon, the treatment of this with sulphuric acid to convert it into bisulphanthrachinonic acid, and the melting of the corresponding sodium salt with hydrate of sodium, whereby alizarin is formed. Adolph Ott gives some particulars of its preparation.

*Anthrachinon* is formed by the oxidation of the anthracen with bichromate of potassium and sulphuric acid, the operation being conducted in tubs lined with lead, and with the use of steam. It is advantageous to use acetic acid along with the sulphuric acid (in dilution), which is added to the intimate mixture of anthracen and bichromate. Towards the end of the operation some nitric acid is also advantageously employed. The crude product is partially purified by solution in concentrated oil of vitriol at  $70^{\circ}$  C. ( $= 158^{\circ}$  F.), leaving it in contact as long as sulphurous acid is disengaged, then precipitating the solution in water, thoroughly washing the precipitate, pressing and drying it, at  $50^{\circ}$  C. ( $= 122^{\circ}$  F.), a greenish-gray impalpable powder being thus obtained.

*Bisulphanthrachinonic acid* is produced from this powder by treatment with 4 to 5 parts of fuming sulphuric acid at a temperature of  $270^{\circ}$  to  $290^{\circ}$  C. ( $= 518^{\circ}$  to  $554^{\circ}$  F.). Hereby it is important to proceed as quickly as possible to prevent loss by the formation of a large amount of phthalic acid. The operation, which is best conducted in cast-iron vessels, is, on a large scale, completed in two hours. Owing to the sublimation of a portion of the anthrachinon, at the high temperature employed, suitable provisions for the condensation of the vapor must be made. The black, pitchlike product is exhausted with boiling water, the filtered solution is saturated with chalk, the solution of the bisulpho-salt is filtered from sulphate of calcium, and decomposed with carbonate of sodium, whereby the sulpho-salt of sodium is formed. The clear liquid, which now has the appearance of a decoction of Brazil-wood, is siphoned off, evaporated to  $20^{\circ}$  B., and

allowed to cool. A portion settles, and yields alizarin with a bluish shade, while the liquid portion yields such with a yellowish tint.

Alizarin is now produced from either of these portions by heating their solutions, of a certain specific gravity, with caustic soda in iron kettles, at a temperature of  $170^{\circ}$  to  $200^{\circ}$  C. ( $=338^{\circ}$  to  $392^{\circ}$  F.); the kettle being set into oil-baths, and provided with stirrers. If the temperature is exceeded, a reformation of a part of the bisulpho-salt into anthrachinon, or even into anthracen, can readily take place. The time necessary to this operation is dependent on the amount of material employed. A portion is taken out from time to time after the blue color of the melting mass passes over into violet-blue, is dissolved in water, and a few drops of sulphuric acid added. If large quantities of flocculæ separate, the operation is nearly or quite complete. The mass is finally dissolved in water, the alizarin precipitated (in wooden tubs) by hydrochloric or sulphuric acid, washed in a filter-press, and, in order that it may remain suspended, it is subjected to agitation in a special apparatus, being brought into commerce as *pate* of either 10 or 15 per cent. Chem. News, Sept. 4th, 1874, p. 113.

*Artificial Alizarin.*—J. Reber states that artificial alizarin can be distinguished from the natural by treating the dyed goods with solution of permanganate of potassium and then with an acid. The red of madder becomes reddish-yellow, whilst that of artificial alizarin acquires a distinct rose-red. If bichromate of potassium solution, followed by nitric acid, is employed, the reaction is still more delicate; the natural color becoming completely bleached, while the artificial alizarin retains the characteristic rose-red. Ph. Centralhalle, 1875, No. 19, p. 154.

*Hæmatoxylin* has been found exceedingly sensitive to alkalis by O. Maschke, who on this account suggests its application as an acidimetical indicator. He had found that when a dilute solution is boiled for some time in a platinum vessel, the atmosphere being free from ammonia, the solution is

simply turned *brownish* or *brownish-yellow*. But if the experiment is repeated in a test-tube, the solution acquires in a few seconds a purple-red color, evidencing not only an extreme sensitiveness to the action of the alkali, but also the solubility of a portion of the alkali contained in the glass at a boiling temperature. See Processes, in this report. Arch. Pharm., January, 1875, p. 34.

*Xylindein*.—This coloring matter, which is formed in decaying wood by the pathological influence of *Peziza æruginosa*, and which was first examined by Fordos and Rommier, has been extracted from such wood by C. Liebermann, and obtained in a pure condition. It forms small, strongly copper-glistening, four-sided crystalline laminæ, which, when washed with phenol, and then with ether, resemble in brightness and color cœrulignon or sublimed indigo. The substance is insoluble in most solvents; dissolves in concentrated sulphuric acid with a grass-green, and in phenol and in anilin with a handsome dark-green color. Ch. Centralbl., No. 43, 1874, p. 677; Ber. Chem. Ges., vii, 1102.

*Thamus Red*.—According to F. A. Harsten, the coloring matter of the fruit of *Thamus communis* is obtained by expressing the fruit, and boiling the juice; the coloring matter is thus precipitated along with coagulated albumen. From the dried precipitate the coloring matter is extracted by means of benzin, with which a further quantity may also be obtained from the dried pods. The bright orange-colored solution is allowed to evaporate and deposits thamus red in thin prisms or plates, which are purified from fatty matter by boiling with solution of potassa, resolution in benzin, and crystallizing. It is insoluble in water, readily soluble in alcohol and in ether, and very soluble in benzin; dyes linen and silk; resists the action of strong alkalies and of boiling nitric acid, but is dissolved by concentrated sulphuric acid, forming an indigo-blue solution. A. J. Ph., September, 1874, p. 425; from Jour. Chem. Soc., 1874.

*Monas Red*.—The red coloring matter of these peculiar bacteria, "*Monas prodigiosa*" (see Materia Medica, in this report),

has been examined and studied by Otto Helm. The similarity of this coloring matter to anilin red has already been pointed out by Prof. Erdmann. Helm points out its reactions, and finds some of them to differ from anilin red very decidedly, while many reactions of the two bodies resemble each other, as will be observed when comparing its properties as below described with those of anilin red: Monas red is insoluble in water, and but partly in ether, but alcohol dissolves it readily and completely. By muriatic acid its color, which is somewhat yellowish-red, is changed to rose-red, and with excess, and at a boiling temperature, this color is changed but little. A few drops of sulphuric acid changes its color to rose-red; excess of concentrated acid gradually to violet; equal parts of solution and sulphuric acid a pure violet color. Nitric acid reacts similarly to sulphuric, but in decided excess produces a dirty yellow color. Sulphurous and acetic acids also produce the rose-red color. Caustic potassa and ammonia solution change the color to yellow, which returns to rose-red upon neutralization with acid. Carbonate of potassium has the same effect, but carbonate of ammonium does not change it. The color is turned yellow also by lime-water, weak chromic acid solution, and solution of hypochlorite of sodium; while chlorine and chlorinated lime solution bleach it immediately. Muriate of tin bleaches it in the course of time. Its alcoholic solution remains unchanged for a long time, even when exposed to light, and mixed in all proportions. The coloring matter may be obtained in a purified condition by evaporating the clear alcoholic solution at a moderate temperature, extracting the residue with petroleum ether, and evaporating the solution, when a handsome blood-red residue is formed, which possesses the above-described reactions with marked distinctness. Arch. Pharm., January, 1875, p. 19.

*Fluorescence of certain Coloring Matters in Castor Oil.*—Some coloring matters derived from woods, not showing any fluorescence when dissolved in water, alkaline solutions, alum, or alcohol, are found by C. Horner to exhibit this phenomenon on treatment with castor oil; whilst other substances, which fluoresce in alcohol, etc., are observed to show this property

with augmented intensity. To obtain clear solutions, the materials are first boiled in alcohol, filtered, evaporated to dryness, and then heated with the oil. On transferring some of the prepared solution to a test-tube and reheating, the fluorescence disappears as the temperature approaches the boiling-point, but returns on cooling. *Cudbear* yields a brilliant orange, fluorescent light, and is visible in diffused daylight. A condensing lens is necessary to show this in alcoholic solution. *Camwood* exhibits a powerful apple-green fluorescence. In aqueous or alcoholic media it is wholly destitute of this property. In *logwood*, unless the castor-oil solution is saturated, sunlight and a lens are requisite to bring out the fluorescent character. *Turmeric* is well known to fluoresce powerfully in alcohol a yellow-green, and in benzol a blue-green. In castor oil, however, the fluorescence is at least three times as bright as in other fluids, and may be described as a vivid emerald-green. These facts show that, in studying the phenomena of fluorescence, advantage should be taken, whenever possible, of the valuable solvent property of castor oil. Ph. Jour. Trans., October 10th, 1874, p. 282.

*New Dyes.*—Messrs. Croissant and Bretonnière, of Laval, France, have introduced a series of very brilliant new dyes, comprising all shades of brown, yellow, and gray; some tints of lilac, grays, and violets, and a color very nearly approaching black. According to Adolph Ott these colors are produced by the action of certain sulphides at a more or less elevated temperature, according to the nature of the substance under treatment and the tint required, upon such substances as wood, sawdust of all kinds, humus and vegetable detritus, lichens, and mosses, bran, farina, gluten, starch, sugar, glucose, cellulose, paper, and cotton waste, tannin, gallic acid, gelatin, casein, fibrin, blood, horn, soot; tartaric, citric, and formic acids, and their alkaline salts; resins; aloes, guaiacum, dragon's blood; gum-resins, such as gum-lac, etc. The details of the process are not given. The new dyes are soluble in water, are more intense than most natural dyes, and adhere to the fibre without any mordant. While not as brilliant as

the anilin colors, they possess a warmer tone, and may be manufactured more profitably. Ch. News, Oct. 9th, 1874, p. 170.

In permanence the new colors greatly outstrip those now in use. They are not affected by light, acids, oxalate of potassium, nor even hot soda-lye. Concentrated chlorine alone affects them. When used along with other colors they render the latter more permanent, especially the anilin preparations. Varieties of shades are not produced by mixtures, but by regulating the temperature to which the color is exposed in the course of manufacture. They dye wool, silk, linen, and cotton equally well; hence mixed goods can be dyed in one operation, the color producing one and the same tone of equal intensity, both upon the weft and the warp. To give an idea of the cheapness of these dyes, 1 cwt. of dye from sawdust costs only thirty shillings, whereas its equivalent of extract of logwood, for which it is a good substitute, costs £7 10s. Ibid., Oct. 16th, 1874, p. 180.

A special committee has investigated these colors in order to ascertain their value for the various purposes of dyeing and printing. From their report, it appears that these colors possess great durability; ink-spots, for instance, being readily removed by means of oxalic acid without the dyes themselves being changed in the least. Their exceptional affinity for the fibre was illustrated by the fact that they adhered without heating the dye-bath. It is preferable, however, to use a warm-bath, and, as mordant, bichromate of potassium may be advantageously employed. Different metallic salts yield various shades. Samples of fabrics, dyed in the various shades that have been produced with the new colors, gray, gray-brown, dark-brown, brownish-yellow, and yellow, of great beauty, are annexed to the number of the "Bulletin of the Industrial Society of Mulhouse," in which the report of the aforementioned committee appears. Ch. News, Feb. 19th, 1875, p. 75.

Otto Witte, who has subjected the new dye-products to examination, finds them to be composed of complicated alkaline mercaptates, such as would be produced by the action of

melting alkaline sulphhydrates upon carbohydrates. The samples examined by him were found to possess an intense odor of mercaptan, and consisted of black, porous, and very light masses. He proposes to make extensive studies upon the action of melting sulphhydrate of sodium upon the carbohydrates. Ber. d. Ch. Gesell., No. 16, 1874, p. 1530.

According to the detailed description of the French patent, the process is based upon the removal of hydrogen from the substance named by means of sulphur. The patentees call these products "organic sulphides," in which the hydrogen is said to be replaced by oxygen. These are oxidized on exposure to air, and by the action of acids upon them sulphuretted hydrogen is evolved. To make the coloring matter, from bran, for instance, the bran is mixed in a sheet-iron kettle with caustic soda and flowers of sulphur in certain proportion, the mixture is worked so as to form a uniform mass, and the kettle is then closed with a cover and heated to 250–300° C. (= 482–572° F.). The sulphide of sodium, formed in this process, reacts upon the organic substance, yields to it sulphur, and a considerable quantity of HS is evolved. When the process is ended a black, friable, hygroscopic mass remains, which is completely soluble in water, forming a solution of a sap-green color, and of a garlicky odor. According to the proportions of ingredients and the temperature applied, the various shades and tints are produced. Ch. Centrbl., No. 50, 1874, p. 798.

#### ALBUMINOIDS.

*Albuminoids.*—A. Commaille has all along denied that the albuminoids could be regarded as protein or any other single substance associated with bases or salts. Along with Millon he has shown, as is admitted by Berzelius, Quevenne, etc., that milk contains two caseins and an albumen, which he has named *lactalbumen*; and also another principle, which, in conjunction with Millon, he has named *lactoprotein* (the *galactozymose* of Béchamp?). He is of opinion that lactoprotein plays an important part in the spontaneous coagulation of milk. That the albuminoids do not all combine with the same weight of platinum, he has already shown (Moniteur



Scientifique, 1866, p. 897), and he thinks that this, as well as the rotatory power, may prove that they are specifically distinct. The albumen of milk, and that of the liquid of ascites, are, as has been already admitted by Hoppe-Seyler, identical with the albumen of unchanged blood-serum, and their platinum compounds contain  $\text{Pt} = 8.50$  per cent. The albumen of red blood-globules approximates closely to the albumen dissolved in the liquid which moistens the cerebral substance, furnishes the albumen of pathological urines, and its platinum compound contains  $\text{Pt} = 10.50$  to 11 per cent. Vitellin resembles coagulated white of egg ( $\text{Pt} = 8$  per cent.); whilst casein of milk approaches certain principles known as vegetable casein ( $\text{Pt} = 6.50$  per cent.), such as almondin, fibrin of gluten, etc. Ch. News, July 3d, 1874, p. 8; from Compt. Rend., May, 1874.

*Albumen.*—The following method is recommended by L. Girgensohn: A certain quantity of the albumen-containing liquid is mixed with one-half its volume of a 20 per cent. solution of common salt, and sufficient solution of tannin to completely precipitate the albumen is added. The precipitate is collected upon a tared filter, washed with distilled water until chloride of sodium is no longer indicated, and is then washed with boiling alcohol until the filtrate no longer indicates tannin. The residue, when dried and weighed, gives direct the quantity of albumen contained in the liquid under examination. For albuminous urine, the author suggests that it is advisable to remove the uric acid by acidulating with acetic acid, and allowing it to stand in the cold. Ph. Centralhalle, May 14th, 1874, p. 158.

*Albuminates and Peptones.*—According to Alb. Adamkiewicz the entire group of albuminates is subject to the following reaction: The albuminate is dissolved in glacial acetic acid, and concentrated sulphuric acid is added, when a handsome violet color with faint fluorescence is produced. When properly concentrated it shows in the spectrum an absorption which, like urobilin (coloring matter of urine), and the red oxidation-product of choletellin (coloring matter of gall), lies



between Fraunhofer's lines C and F. Bodies that do not belong to the albuminates do not give this reaction; the peptones, to the contrary, react precisely like the albuminates. Ph. Centralhalle, No. 17, 1875, p. 139; Ber. d. Ch. Ges.

*Detection of Blood*.—The usual method of detecting blood by the production of hæmin-crystals is a very good one, but Prof. Böttger finds the method of Almén to be more simple and perfectly reliable, and especially applicable to urine. A few cubic centimetres of tincture of guaiac, and an equal volume of oil of turpentine, are introduced into a test-tube, and a little of the urine is then added, when, if traces of blood are contained in the urine, an intense blue color is immediately produced; whereas normal or albuminous urine will produce no such change. In case the blood is attached to woven fabrics, wood, etc., the following method is recommended: A clear filtered tincture of guaiacum-wood (5 grams to 100 c.c. of absolute alcohol) is prepared; 5 c.c. of this tincture are mixed with the same quantity of oil of turpentine, and the contaminated part, previously moistened with weak acetic acid, is introduced, when, if blood is present, the blue color will immediately be produced. Zeitschr. Oest. Apoth. Ver., June 20th, 1875, p. 295.

*Fibrin*.—According to A. Gautier, if a solution of blood-fibrin in aqueous chloride of sodium is freed from the salt by dialysis, and the solution is then rapidly concentrated in vacuo at a temperature of 45° C. (= 113° F.), a neutral solution is obtained, which possesses most of the properties of ordinary albumen. Ch. News, September 18th, 1874, p. 144; Compt. Rend., July 27th, 1874.

#### FERMENTS.

*Alcohol Yeast*.—M. Traube's experiments upon the behavior of alcohol yeast in media which are devoid of gaseous oxygen, lead him to the following conclusions:

1. Yeast germs are not developed in the absence of free oxygen, even in grape-juice, the medium most favorable to their formation.

2. Developed yeast, however, is capable of multiplying in the proper media, even when no traces of oxygen are present, as has been contended by Pasteur, Brefeld's assertion to the contrary notwithstanding.

3. The assertion of Pasteur that yeast, when excluded from air, multiplies at the expense of the oxygen of the sugar, is incorrect; since its growth ceases even when the greater part of the sugar is still undecomposed. The yeast growth is due to albuminous substances contained in the mixture.

4. Yeast is capable of producing alcoholic fermentation in pure solutions of sugar, even in the absence of all traces of oxygen; but it does not multiply under these conditions. The assumption of Pasteur, therefore, that the fermentation of sugar is dependent on the organization-process of the yeast is incorrect.

5. Grapes are capable of producing alcohol from their sugar, under complete exclusion of air, even when strongly bruised; but the expressed juice does not possess this property.

6. This does, however, not necessarily decide that alcoholic fermentation is a vital process, dependent on the vitality of the cells. Ph. Centralhalle, No. 40, 1874, p. 330.

*Yeast.*—Pasteur considers it established that alcoholic yeast can multiply in an aqueous solution of pure sugar, with an ammoniacal salt and the ash of yeast, or alkaline and earthy phosphates, including those of magnesia and potash. This he regards as the first proof that the albuminoid matters of certain living beings may be formed by sugar and ammonia with mineral phosphates and sulphates without the aid of light and of "green matter." Yeast which has germinated in a mineral medium becomes more suited to multiply in a similar medium. It has become acclimatized. Ch. News, March 20th, 1874; from Compt. Rend., Jan. 26th, 1874.

*Yeast.*—It is an established fact that yeast may be exposed to a comparatively high temperature without losing its power of inciting fermentation. In a dry condition it may be exposed for hours to a temperature of 100° C. (= 212° F.) (Wiesner). Emil Schumacher has now determined that when

exposed to  $-113^{\circ}\text{C.}$  ( $= -171.4^{\circ}\text{F.}$ ), the lowest temperature obtainable, with a mixture of solid carbonic acid and ether, it still retained its power of germination, as proven by its action on sugar solutions. Ph. Centralhalle, No. 47, 1874, p. 892.

*Compressed yeast* may be prepared, according to J. V. Divis, from beer-yeast as follows: The yeast is mixed, in a shallow wide tub, with 6 to 8 volumes of very cold water, containing a little carbonate of ammonium; is then thoroughly stirred, the supernatant liquid is decanted, the residue is stirred with a fresh portion of water, and is then expressed in a filter-press. The residue in the press is then mixed with starch or malt-meal, and then constitutes a compressed yeast of unexceptionable quality. Sometimes the beer-yeast does not separate readily, in which event the addition of ice, or the addition of a little alum to the second wash-water will facilitate its separation; when using alum, however, it is necessary to resort to a third washing. Ph. Centralhalle, June 18th, 1874.

*Conversion of Alcohol into Acetate of Ethyl by the Agency of Cryptogamic Life.*—Mr. F. M. Rimmington's attention having been drawn to the strong odor of acetate of ethyl, acquired by a portion of concentrated infusion of quassia (which seems to contain alcohol, Rep.), endeavored to explain the cause, and found, upon examination, that its formation is owing to the presence of a fungus growth; his observation being supported by the microscopic determination of numerous unicellular organisms composing the sedimentary deposit found in the infusion. Lignum quassiae has often a pasty smell and a corresponding taste; and to this he attributes the origin of some of the fungus growth, which is most probably a penicillium. Ph. Jour. Trans., Sept. 12th, 1874, p. 201.

*Diastase.*—Perret recommends its preparation as follows: Fresh malt is infused in six parts of cold water for twenty-four hours, and is then gradually heated to  $70^{\circ}\text{C.}$  ( $= 158^{\circ}\text{F.}$ ), by which the greater part of the albumen is coagulated. The strained liquid is then rapidly cooled in shallow vessels,

by the aid of a centrifugal blower, and is then evaporated to a thick consistence at a temperature not exceeding 50° C. (— 122° F.). The syrupy liquid is mixed with six volumes of strong alcohol containing one per cent. of ether, whereby diastase, salts, and remaining albuminous bodies are precipitated, and the precipitate may be used in this condition, but does not keep. By expressing it, treating it with two parts of cold water, macerating for two hours, and filtering, the albuminous bodies are removed, and, upon the concentrating of the filtrate, a nearly pure diastase solution remains, and is precipitated by absolute alcohol. The flocculent precipitate when washed with a little water and dried, is light-yellow, and has a peculiar odor. In order to dissolve the diastase so obtained, it is necessary to soak it an hour or two in water. Ph. Centralhalle, No. 41, 1874, p. 340.

*Diastase.*—Dr. Collins C. Hunt draws attention to diastase as a valuable medicinal agent. The action of diastase upon the human economy, aside from its direct and immediate digestive power, is in itself of peculiar interest. When properly administered, it not only aids in the digestion of starchy food in the stomach, but seems also to impart tone and vigor to the digestive functions generally; while through this action, it further supplies energy to the brain and nervous system. It is most beneficially employed along with pepsin and other agents promotive of digestion, and in the form of syrup or lozenges. Am. Dr. Circ., Aug. 1874, p. 142.

*Pepsin, Pancreatin, Ptyalin.*—V. Wittich had found that fibrin is capable of absorbing pepsin, and that the latter can then not be washed out with water. It becomes active, however, as soon as it is brought in contact with dilute hydrochloric acid, and the combination is dissolved with the formation of pepton and freeing of pepsin. Ebstein and Grützner have since confirmed this, and O. Nasse also agrees to the views of v. Wittich, but is of the opinion that the combination of fibrin and pepsin is not of a mechanical, but of a real chemical character. He has found that coagulated albumen is capable of fixing pancreatin and amyllum ptyalin in the

same manner. By washing the swelled amylum with ice-cold water any glucose formed may be completely removed; if it is then digested with water at 30°–40° C. (— 86°–104° F.), glucose is abundantly formed, and the ferment is liberated. Ph. Centralhalle, No. 40, 1874, p. 330.

*Ferment of Rennet.*—O. Hamarsten finds that the coagulation of milk is owing to the direct action of a peculiar ferment upon the casein, and not to the conversion of milk-sugar into lactic acid. To obtain this ferment the author agitates the rennet (an aqueous extraction?) with carbonate of magnesium, repeating the operation a number of times in order to remove the pepsin. In this way the greater part of the ferment is obtained in solution, which does not give the xanthoprotein reaction. Its solution is not precipitated by alcohol, nitric acid, iodine, or tannic acid, is not coagulated by boiling, but loses its activity. Neutral acetate of lead does not, basic acetate does precipitate it from solution. The author has found that besides pepsin and the above ferment, the mucous membrane contains a third ferment. Pepsin and the ferment described are rapidly destroyed by alkaline solutions, but the third ferment is not changed. Ch. Centbl., No. 50, 1874, p. 791; Bull. Soc. Chim. Par.

*Pancreatin.*—Charles Hamm has prepared pancreatin by the process for saccharated pepsin, and finds it to be a grayish-white powder, one grain of which will emulsify one drachm of cod-liver oil. Pancreatin is properly administered with alkalies, and may be given in doses of from two to eight grains. From one hundred fresh pancreas, the author obtained twenty-five ounces of saccharated pancreatin. The author made experiments upon its emulsifying power in an acid, an alkaline, and in a neutral condition, and found the emulsifying power to be greater in the alkaline and neutral, than in the acid condition. To make an emulsion with cod-liver oil he gives the preference to a slight alkalinity, using two drachms of pancreatin, one drachm of bicarbonate of sodium, and two fluid ounces of water to fourteen fluid ounces of the oil. Am. Dr. Circ., July, 1874, p. 122.

## URINARY AND BILIARY COMPOUNDS.

*Urea*.—J. E. Loughlin recommends its preparation from filtered urine by adding to twenty parts one part of commercial nitric acid, allowing to evaporate spontaneously, pressing the blackish-red scales between folds of filtering-paper, dissolving at 200° F. in twenty parts of water, treating the solution with four parts of animal charcoal at a boiling temperature, filtering, evaporating to one-eighth the bulk, and allowing to crystallize, repeating the recrystallization if necessary. The nitrate of urea is dissolved in twenty parts of water, mixed with carbonate of barium, evaporated to dryness, redissolved in water, again evaporated to dryness, the dry mass extracted by boiling in 95 per cent. alcohol, the solution filtered, evaporated to a small volume, and allowed to crystallize. The crystals are dried over sulphuric acid, and constitute pure urea. *Am. Chem.*, April, 1875, p. 362.

*A simple apparatus for estimating Urea* has been devised by R. Apjohn, which possesses the advantages of being easily

FIG. 55.

worked, and giving results of at least equal accuracy to those usually employed. Besides, the materials necessary for its construction are to be found in every laboratory. They are:

1. A glass measuring-tube of about a foot in length, drawn out at the end, which will be uppermost when the tube is

used, like a Mohr's burette, and subdivided into 30 parts of equal capacity, the aggregate volume of which is 50 c.c.

2. A small wide-mouthed gas-bottle of about 60 c.c. capacity.

3. A short test-tube of about 10 c.c. capacity, and of such height that when introduced into the gas-bottle it will stand within it in a slightly inclined position. (See Fig. 55.)

The graduated tube, held in a clamp attached to a retort-stand, is depressed into a glass cylinder, nearly filled with water, until the zero-mark, which is near the upper end, exactly coincides with the surface of the water. 15 c.c. of hypobromite solution (composed of 100 grams of NaHO, 250 c.c. of water, and 25 c.c. of bromine) having been poured into the flask, the test-tube containing the urine is introduced by means of a forceps, care being taken that none of its contents shall spill into the hypobromite. The flask is now closed with a very accurately fitting india-rubber stopper, perforated with a hole, in which is inserted a short piece of glass tubing, open at both ends, and connected with the measuring-tube by means of a piece of elastic tubing. It is now inclined so as to allow the urine to mix with the hypobromite. Effervescence at once commences, and as it proceeds the measuring-tube is gradually raised so as to relieve the disengaged nitrogen from hydrostatic pressure. The flask is shaken a few times, and, when the reaction is completely over, the apparatus is left for a few minutes until it has acquired the temperature of the room in which the experiment is performed. Another exact levelling of the measuring-tube is made, and the number of divisions corresponding to the volume of the developed nitrogen is read off. Each division (1.5 c.c.) of nitrogen corresponds to 0.005 gram of urea. The apparatus may be made more delicate by using a longer and narrower measuring-tube, which would admit of finer subdivision; and strictly accurate results could be obtained if the necessary corrections in the volume of the gas for temperature, pressure, and tension of vapor were made. The instrument is, however, not intended to yield results of theoretic accuracy, it being intended to furnish the means for estimating urea rapidly and with



sufficient precision for medical purposes. Ch. News, January 21st, 1875, p. 36.

*Test-paper for Urea.*—Musculus finds that when urine which has arrived at full alkaline fermentation is thrown on a filter, the pores of the paper are soon filled up with globules of a certain ferment, and the filtration slackens. If the paper is then washed with distilled water till the alkaline reaction has disappeared, and dried at a temperature of 35° to 40° C. (= 95° to 104° F.), it affords an efficient test for urea, possessing the power of converting urea, even in very dilute solution, into carbonate of ammonium. The test-paper should be colored yellow with turmeric, then dried and preserved in well-stoppered bottles. If a slip of the paper is soaked in a solution of urea containing  $\frac{1}{10000}$ th part, it soon becomes covered with brown spots. The detection and determination of small quantities of urea in well-waters supposed to be polluted by the drainage of cesspools may easily be performed with this paper, such water being concentrated if necessary. Before applying the test, the suspected liquid must be neutralized, in order to decompose alkaline carbonates and bicarbonates. Neutral alkaline salts do not interfere. Ch. News, March 6th, 1874; from Compt. Rend., January, 1874.

*Uric Acid.*—E. Reichards gives the following method of its preparation from guano: The relative amount of uric acid in the guano is first determined, since some varieties contain it in too small a quantity to pay extraction. This preliminary test is made by boiling a small quantity with excess of soda-lye, filtering, and precipitating with an acid. The quantity of crude acid so obtained will indicate readily whether or not the guano may be profitably extracted. A quantity of guano is now selected, and is boiled with dilute muriatic acid, repeatedly, as long as any phosphate of calcium is dissolved. The residue is then thoroughly washed with water, heated with dilute solution of caustic soda in excess, the solution is filtered, and precipitated with muriatic acid. The acid may be partially purified, and a considerable proportion of humus removed, by adding the muriatic acid in very small



quantity at first, and rejecting the first portion of precipitate formed. The further purification is based upon the same principle, *i. e.*, the precipitation of the humus matter before the uric acid will precipitate. The crude acid is redissolved in caustic soda, the clear solution is placed in a tall glass vessel, and muriatic acid is carefully added until a permanent precipitation results; it is then agitated, and the precipitate allowed to settle, or the solution filtered. To the filtrate, muriatic acid is again added, and the precipitate is again filtered off, and this is repeated until the solution has a light-yellow color. The uric acid is then precipitated with muriatic acid in excess, is washed, and dried. While the yield is not larger than when animal charcoal is used for its purification, the yield being 26 per cent. of the crude acid used, the operation is much more rapid, and more economical. Arch. Ph., April, 1875, p. 323.

*Dextrin in Urine.*—E. Reichardt had observed that the urine of persons suffering with diabetes mellitus, gave a reaction analogous to that of dextrin, when the glucose had partially or entirely disappeared, and subsequently he determined dextrin to be present. He has isolated a substance, which, in its general characters, in its reactions, and in its ultimate composition, corresponds very closely with dextrin. Arch. Pharm., Dec. 1874, p. 502.

*Determination of Albumen in Urine.*—A. Hilger's experiments prove that the most important reaction for albumen in urine is that with acetic acid and ferrocyanide of potassium, and that its application should never be neglected. He recommends three tests: 1. That with nitric acid; 2. Coagulation with addition of acetic acid; 3. Acetic acid and ferrocyanide of potassium. Arch. Ph., May, 1875, p. 388.

Picric acid is recommended by Dr. Galippe as the best reagent for albumen in urine. The acid is dissolved in water, a few cubic centimetres of the solution are placed in a test-tube, and the suspected urine is added drop by drop, when, if albumen is present, a characteristic cloudiness is produced.

If the test-liquid is added to the urine no reaction takes place. Arch. Ph., March, 1875, p. 268.

*Determination of Biliary Acids in Urine.*—A. Hilger has had opportunity to examine a urine which, owing to poisoning by phosphine, contained unusually large quantities of biliary compounds. He applied the method proposed by Hoppe-Seyler, but finds it advantageous to precipitate the biliary compounds by basic acetate of lead directly instead of first evaporating the urine to dryness, extracting with alcohol, etc. The precipitate obtained by the author's modification is carefully dried at a moderate temperature, extracted three or four times with absolute alcohol, the solution is mixed with carbonate of sodium, evaporated to dryness, and the biliary compound with soda extracted by warm alcohol from the mixture with carbonate of lead. The alcohol solution may then be tested directly by Pettenkofer's method. Besides the acids, the author found the urine to contain bilirubin and biliverdin. Gmelin's method for their separation consists in first removing the bilirubin from acid solution by means of chloroform, while the biliverdin is precipitated from the acid solution by baryta-water, from which it is again extracted by acidulated alcohol, forming a green solution. The author has observed that the dried precipitate, obtained with baryta-water, yielded bilirubin to chloroform; an observation which has hitherto not been made. The author also contradicts the statements, usually made in manuals, that biliverdin and biliprasin do not produce Gmelin's reaction. He finds that all the biliary coloring-matters produce, upon addition of nitric acid containing nitrous acid, the characteristic color-changes,—green, violet, blue. Arch. Ph., May, 1875, p. 385.

*Glycocholic Acid.*—G. Hübner contributes the following rapid method for preparing this acid: Fresh ox-gall is placed in a narrow cylinder, a layer of ether is put on top, and then some concentrated mineral acid is added. The mass beneath the ether soon assumes a firm crystalline consistence, and the ether acquires a yellow to brown color; while, after several days' standing, the upper portion of the crystalline mass is

colored strongly green from coloring-matter which had been dissolved by the ether. It is, therefore, best, as soon as the crystalline mass has formed, to decant the ether, to mix the rest with a large quantity of water, and to shake it thoroughly. The crystalline undissolved portion is then collected upon a filter, washed with water until the washings pass colorless, and is then recrystallized from hot aqueous solution, when it is obtained perfectly colorless. The mother-liquors from the crude crystallized mass are of a greenish color, and contain taurocholic acid, and the remainder of the gall constituents. By the author's method the pure acid is readily obtained, in large quantities, without the application of animal charcoal. He recommends that to 40 c.c. of the crude gall, not more than 2 c.c. of pure concentrated muriatic acid need be used; a larger quantity of the latter interfering with the rapid crystallization. Ch. Centralbl., No. 46, p. 723.

*Glycocol.*—R. Engel observes that glycocol, if boiled with a concentrated solution of potash or baryta, gives a blood-red coloration. If treated with sulphate of copper, and then with potash, it hinders the precipitation of the copper, giving a fine blue coloration. It reduces mercurous nitrate in the cold or heat, gives an intense red color with perchloride of iron, which disappears upon the addition of an acid, and may be reproduced by cautious neutralization with ammonia. If a little glycocol in solution is mixed with a drop of phenol, and hypochlorite of sodium is added, a fine blue color appears in a few moments. Ch. News, June 4th, 1875, p. 250; from Compt. Rend., May 3d, 1875.

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# REPORTS OF COMMITTEES.

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## REPORT OF THE COMMITTEE ON UNOFFICIAL FORMULAS.\*

BY RICHARD V. MATTISON.

THE committee respectfully submit the following formulas which have proved acceptable to the committee:

### *Granular Effervescent Citrate Magnesium.*

R.—Magnesium Citrate,	.	.	.	.	.	.	℥v.
Sodium Bicarbonate,	.	.	.	.	.	.	℥vj.
Acid Citric,	.	.	.	.	.	.	℥v.
Sugar,	.	.	.	.	.	.	℥v.

Mix the above, all in powder, with sufficient absolute alcohol to moisten the mass thoroughly, pass through a No. 6 sieve and separate the portion which has not granulated by means of a No. 20 sieve, and dry the granules at a temperature not above 60° C.

The soluble citrate of magnesium for above is prepared by taking nine troy ounces of citric acid, and three troy ounces of magnesium carbonate (Jennings), powdering both, and moistening the mixture with two fluid ounces of water added gradually. Stir occasionally, and dry at a temperature not exceeding 45° C., and powder, pass through a No. 80 sieve and preserve for use.

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\* Read at the third session. That portion of the report giving formulas for elixirs was referred to that special committee.—EDITOR.

### *Granular Effervescent (Vichy Salt).*

R.—Sugar,	℥iv.
Acid Citric,	℥v.
Sodium Bicarbonate,	℥vij.
Magnesium Carbonate,	grs. lx.
Calcium Carbonate,	grs. lxxiv.
Sodium Chloride,	grs. cxxvij.
Sodium Sulphate,	grs. cxxvij.
Ferrous Carbonate,	grs. vij.

Mix, and observe preceding directions.

### *Iodinized Collodion.*

R.—Collodion, U. S. P.,	℥j.
Iodine,	℥ss.

Mix.

### *Red Syrup (Orange).*

R.—Saturated Tincture Fresh Orange Peel,	℥iv.
Citric Acid,	℥iiss.
Simple Syrup,	Cong. j.
Comp. Tinct. Cochineal, q. s., to color.	

Used as substitute for red Syrup Orange de Malte.

### *Liquid Rennet.*

R.—Rennets (Calves'),	No. xxiv.
Sherry Wine,	Cong. ij.
Alcohol,	Cong. ij.
Water,	Cong. viij.

Let stand two weeks, and filter.

### *Cologne Water.*

R.—Oil Neroli (Bigarade),	℥xiv.
Oil Lemon,	℥viij.
Oil Lavender Flowers,	℥iv.
Water,	Oiss.
Alcohol, deod.,	Cong. ij.

Mix.

### *Chlorodyne.*

R.—Morphine Muriat.,	grs. clx.
Aqua Destill.,	℥x.
Chloroform.,	℥xxx.
Tinct. Cannab. Ind.,	℥x.
Acid. Hydrocyan. Dil.,	℥iv.
Alcohol. Fort.,	℥x.
Ol. Menth. Pip.,	gtt. xl.
Oleoresin. Capsici,	gtt. xx.



Heat morphia, water, and alcohol together until a clear solution is effected. When cold, add rest of ingredients, and mix thoroughly, filter, having previously added q. s. alcohol to make f $\overline{3}$ xxx.

Respectfully submitted,

RICHARD V. MATTISON.

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## REPORT OF THE COMMITTEE ON FORMULAS FOR ELIXIRS.\*

YOUR committee report we have examined the literature having reference to this subject, have consulted with physicians and pharmacists, and find there exists but little necessity for this Association to make any alteration of the formulas for elixirs adopted at the twenty-first annual meeting, and recommended to be used if such preparations are prescribed.

We are of the opinion that such a nomenclature should be adhered to as will express the remedial composition of these preparations, believing this to be the proper way of making available any such as may possess therapeutic merit.

The plan of having a uniform simple elixir that, from its composition, answers for all general purposes, meets most requirements; and, when this is not the case, it serves as a guide by which the physician in this his special province may determine what best suits the taste of his patient.

And, since the tendency of the Pharmacopœia is to present simple preparations more thoroughly representing the drugs from which they are prepared, more attention is demanded in the construction of extemporaneous formulas, and a thorough knowledge of the various spirits, syrups, and aromatic waters, will give a wide field for choice of auxiliaries, correctives, and vehicles.

This information acquired, the preparation of mixtures which shall conform to the standard alcoholic strength of elixirs and yet be possessed of remedial virtue, from chemicals and galenical preparations, becomes an easy task.

The committee have thought it advisable to offer a revised

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\* Read at the third session.

list of formulas, containing such alterations of those in use as a more extended experience has suggested, and such additions as seem to be required.

The combination of Calisaya bark with iron has arrayed whatever opposition there has been expressed to these formulas. You all understand the nature of this difficulty: it is a question of nomenclature.

Many of the advertising manufacturers of this class of preparations seek to create by a skilful wording the false impression that it is the soluble principles of the bark in their native combinations which they contain; while the truth of the matter is, it is the alkaloids and their salts as found in commerce that are used in their preparation.

Some of our members think this impression could be corrected by the introduction of formulas of this character. This requires the presumption that the Association is willing to allow of the introduction of suitable explanatory names or synonyms, as well as the name derived from the actual constituents.

#### FORMULAS FOR ELIXIRS.

##### *Simple Elixir.*

Take of Spirit of Orange,	.	.	.	.	.	.	2 fluid drachms.
Spirit of Cinnamon,	.	.	.	.	.	.	10 minims.
Alcohol,	.	.	.	.	.	.	4 fluid ounces.
Syrup,	.	.	.	.	.	.	6 fluid ounces.
Water,	.	.	.	.	.	.	6 fluid ounces.

Mix.

##### *Red Elixir.*

Take of Simple Elixir,	.	.	.	.	.	.	15½ fluid ounces.
Compound Tincture of Cochineal,	.	.	.	.	.	.	½ fluid ounce.

Mix.

##### *Elixir of Calisaya Bark.*

Take of Tincture of Cinchona,	.	.	.	.	.	.	8 fluid ounces.
Simple Elixir,	.	.	.	.	.	.	18 fluid ounces.

Mix.

##### *Compound Elixir of Cinchona.*

Take of Compound Tincture of Cinchona,	.	.	.	.	.	.	8 fluid ounces.
Simple Elixir,	.	.	.	.	.	.	18 fluid ounces.

Mix.

Take of Pyrophosphate of Iron, . . . . .	256 grains.
Distilled Water, . . . . .	1 fluid ounce.
Simple Elixir, . . . . .	16 fluid ounces.

Mix.

### *Elixir of Citrate of Bismuth.*

Take of Citrate of Bismuth and Ammonium, . . . . .	256 grains.
Distilled Water, . . . . .	4 fluid ounces.
Water of Ammonia, . . . . .	sufficient.
Simple Elixir, . . . . .	12 fluid ounces.

Mix.

### *Wine of Pepsin.*

Take of Saccharated Pepsin (Scheffer's formula), . . . . .	240 grains.
Sherry Wine, . . . . .	11 fluid ounces.
Water, . . . . .	8 fluid ounces.
Glycerin, . . . . .	1 fluid ounce.
Hydrochloric Acid, . . . . .	$\frac{1}{2}$ fluid drachm.

Dissolve the pepsin in the water and glycerin; add the sherry wine and hydrochloric acid; filter.

### *Elixir of Valerianate of Ammonium.*

Take of Valerianate of Ammonium, in crystals, . . . . .	256 grains.
Water of Ammonia, . . . . .	sufficient.
Compound Tincture of Cochineal, . . . . .	$\frac{1}{2}$ fluid ounce.
Simple Elixir, . . . . .	15 $\frac{1}{2}$ fluid ounces.

Mix.

### *Elixir of Valerianate of Ammonium with Quinia.*

Take of Valerianate of Quinia, . . . . .	128 grains.
Elixir of Valerianate of Ammonium, . . . . .	16 fluid ounces.

Mix.

### *Elixir of Bromide of Potassium.*

Take of Bromide of Potassium, . . . . .	1280 grains.
Red Elixir, . . . . .	16 fluid ounces.

Mix.

### *Bitter Wine of Iron.*

Take of Citrate of Iron and Quinia, . . . . .	128 grains.
Spirit of Orange, . . . . .	2 fluid drachms.
Syrup, . . . . .	4 fluid ounces.
Sherry Wine, . . . . .	12 fluid ounces.

Mix.

*Elixir Guarana.*

(Paullinia.)

Take of Guarana in powder, . . . . .	4 troy ounces.
Diluted Alcohol, . . . . .	sufficient.
Prepare by percolation eight fluid ounces of tincture.	
Add Water, . . . . .	2 fluid ounces.
Syrup, . . . . .	6 fluid ounces.
Spirit of Orange, . . . . .	2 fluid drachms.
Spirit of Cinnamon, . . . . .	10 minims.

Mix.

*Elixir of Gentian with Iron.*

Take of Tincture of Gentian (one troy ounce in eight fluid ounces of dilute alcohol), . . . . .	8 fluid ounces.
Spirit of Orange, . . . . .	2 fluid drachms.
Spirit of Cinnamon, . . . . .	10 minims.
Syrup, . . . . .	6 fluid ounces.
Water, . . . . .	2 fluid ounces.
Citrate of Iron (soluble), . . . . .	256 grains.

Mix.

*Elixir of Hops.*

Take of Tincture of Hops, . . . . .	8 fluid ounces.
Spirit of Orange, . . . . .	2 fluid drachms.
Spirit of Cinnamon, . . . . .	10 minims.
Syrup, . . . . .	6 fluid ounces.
Water, . . . . .	2 fluid ounces.

Mix.

*Elixir Pyrophosphate of Iron, Quinia, and Strychnia.*

Take of Quinia, . . . . .	128 grains.
Strychnia, . . . . .	2½ grains.
Pyrophosphate of Iron, . . . . .	256 grains.
Alcohol, . . . . .	5½ fluid ounces.
Spirit of Orange, . . . . .	½ fluid ounce.
Distilled Water, . . . . .	4 fluid ounces.
Syrup, . . . . .	6 fluid ounces.

Dissolve the pyrophosphate of iron in the distilled water; add the syrup. Dissolve the strychnia in the alcohol and spirit of orange; add the quinia; mix with the solution of pyrophosphate of iron.

*Elixir Sulphates of Quinia, Cinchonia, and Citrate of Iron.*

(Elixir of bark and iron, when described as containing alkaloids of bark in combination with iron.)

Take of Sulphate of Quinia, . . . . .	12 grains.
Sulphate of Cinchonia, . . . . .	12 grains.
Citrate of Iron (soluble), . . . . .	256 grains.
Simple Elixir, . . . . .	15½ fluid ounces.
Distilled Water, . . . . .	½ fluid ounce.

Mix.

*Elixir Sulphates of Quinia and Cinchonia with Citrates of Iron and Bismuth.*

(Elixir of bark, iron, and bismuth, when described as containing alkaloids of bark in combination with iron and bismuth.)

Take of Citrate of Bismuth and Ammonium, . . . . .	256 grains.
Distilled Water, . . . . .	1 fluid ounce.
Elixir Sulphates of Quinia, Cinchonia, and Citrate of Iron, . . . . .	15 fluid ounces.

Mix.

*Elixir Sulphates of Quinia and Cinchonia with Citrates of Iron and Strychnia.*

(Elixir of bark, iron, and strychnia, when described as containing alkaloids from bark in combination with iron and strychnia.)

Take of Elixir Sulphates of Quinia and Cinchonia with Citrate of Iron, . . . . .	16 fluid ounces.
Strychnia, . . . . .	2½ grains.
Citric Acid, . . . . .	5 grains.

Mix.

Respectfully submitted by

WILLIAM MCINTYRE,  
RICHARD V. MATTISON,  
GEORGE W. KENNEDY.

## REPORT OF THE COMMITTEE ON ADULTERATIONS AND SOPHISTICATIONS.\*

YOUR committee respectfully report, that for the purpose of giving the subject the widest publicity, advertisements were inserted into the various pharmaceutical journals, in which we invited contributions of notices of adulterations and sophistications of drugs, chemicals, and kindred articles. We regarded this plan as much superior to that of sending out circulars, inasmuch as these are very frequently mislaid, so that the address is not obtainable when wanted, while a standing advertisement can be readily referred to at all times. Although we elicited in this manner a very much greater number of communications than our predecessors report from circulars, we regret to admit that our advertisements yielded us what we consider but very inadequate returns, only about a dozen replies in all being received during the entire year. In this connection we desire herewith to tender our thanks to the American Journal of Pharmacy, the Chicago Pharmacist, and the Nashville Pharmacal Gazette, for their gratuitous insertion of our notice.

Believing that the earlier a description of any important adulteration is made public, the more good it may accomplish, the chairman of your committee has taken the liberty of presenting a number of these subjects to the notice of the pharmaceutical meetings of the Philadelphia College of Pharmacy. He has in this manner been able, at least in several instances, to expose fraudulent admixtures, and to interfere materially with their further sale.

In the preparation of our report, we have adhered to the classification and alphabetical arrangement of our predecessors. We have endeavored to enumerate only those notes which referred to novel adulterations and sophistications, and those which gave new tests or methods for establishing the presence of foreign substances. It has also been our aim to

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\* Read at the second and third sessions.

condense our memoranda as much as could be done consistently with the presentation of clear and lucid abstracts. For the benefit of those desiring further particulars we have in most cases made references to the original papers.

Before proceeding into details, we wish to call special attention to the outrageous frauds which are constantly practiced in the sale of essential oils. Many of these are daily huckstered about among the dealers and consumers in the larger cities by a class of itinerant vendors, who have their stock in trade with them, and who dispose of their wares for almost any offer that they can obtain. Their oils are usually largely and clumsily adulterated, though it is not always possible to prove the admixture by positive chemical tests. One of these New Jersey distillers frankly admitted to the writer that all the commercial oils of cedar, hemlock, and spruce, made by him and his acquaintances, are prepared by putting the branches of the respective trees into the still with an amount of turpentine proportioned to the price they expected to realize. He prided himself not a little on the superiority of these *distilled* oils over those made by mere admixture with turpentine.

When it is borne in mind, that by far the major portion of the more expensive oils are consumed by bakers, confectioners, soapmakers, and bottlers of mineral or soda water, who have no means for testing them, and who thus become easy victims to these vile swindlers, we are more forcibly than ever before impressed with the desirability of perfecting some plan for the better protection of honest merchants and for the punishment of the guilty. The writer has on two occasions purchased four cans of oil of lemon, one lot of which contained but 75 per cent. of oil, and the other scarcely 33 per cent. Had these been accepted, the loss in the one case would have been about \$75, in the other over \$175. We may well compare this species of fraud to that of passing counterfeit money, and it seems but just that similar punishments should be inflicted for both crimes. Nor are substitutions of this kind by any means confined to our illustrious New Jersey friends. It would almost seem as though European distillers

were trying to rival, if not to surpass them. The writer recently had in his employ a gentleman who claimed to have formerly held responsible positions in two of the largest German houses dealing almost exclusively in essential oils. He exhibited to us a full line of receipts for mixing and cheapening all the more prominent oils, on which he placed great value, and which he was very anxious to compound in this country. Still more recently, the writer was informed by the official representative of an extensive French firm, of Grasse, that all the cheap grades of lavender, rosemary, and origanum or red thyme, sent to this country, both by themselves and other manufacturers, contained at least 75 per cent. of turpentine. And yet some druggists can rarely find essential oils quite cheap enough to suit their views!

#### CRUDE DRUGS AND COMMERCIAL PRODUCTS.

*Agaric.*—Prof. Maisch has examined and described a specimen of so-called white agaric, which had been obtained from New York. It was in the form of a coarse white powder, mixed with irregular pieces; none of them being more than a quarter of an inch in length or thickness. On superficial examination they possessed the physical characters of true agaric. The powder was of a sweetish, subsequently bitter and acrid taste, though this was much less marked than in the genuine drug. When the larger pieces had been freed from adhering dust, they were nearly insipid and entirely devoid of bitterness. Examined under the microscope the peculiar filamentous cells of the fungi were recognized. Some of the pieces had fragments of the lamellæ still attached, showing that the substance was not derived, as it should be, from a *Polyporus*, since that genus is characterized by having the hymenium concrete with the pileus. The inference was, that the sophistication was most probably the pileus of a species of *Agaricus*, from which the lamellæ had been almost completely removed, and which had then been broken into small pieces and mixed with some powder of the larch agaric, so as to impart a bitter taste to it. Am. Jour. Pharm., 1875, p. 10.



*Angelica Root.*—The commercial supply of this drug has been looked into by the writer, revealing the fact that quite a number of different drugs are sold almost indiscriminately under this name. The conclusion arrived at is that the simple name “angelica root” should properly be restricted to the imported drug, which is obtained from the *Archangelica officinalis*, Hoffmann. This can be readily distinguished from the various sophistications by being of darker color externally, by its peculiar and characteristic taste and odor, and by the abundance of descending wrinkled fibres, with which it is furnished. The roots of the following plants were found to be frequently sold as angelica: *Archangelica atropurpurea* (American angelica), *Ligusticum actæifolium* (American lovage), *Aralia spinosa* (Angelica-tree), and *Heracleum lanatum* (cow-parsnip). Am. Jour. Pharm., 1875, p. 197.

*Angustura Bark.*—Prof. Oberlin and Schlagdenhauffen, of Nancy, state that they have found a false angustura bark in a number of French pharmacies. The physical and organoleptic characters correspond completely with those described by Prof. Maisch in the Am. Jour. Pharm., 1874, p. 50. It is stated to be the bark of *Esenbeckia febrifuga*, Martius, s. *Evodia febrifuga*, Saint Hilaire, tribe *Pilocarpeæ*, nat. order *Diosmaceæ*. The tree is very abundant in the province of Minas Geraes, Brazil, where it is known as *Tres folhas vermelhas* or *Laranjeiro do mato*. Jour. de Pharm. et de Chim., Aug. 1874, p. 105.

*Anise Seed.*—A large quantity of anise from the interior of Russia was found to be largely mixed with the fruit of *Conium maculatum*; it had been destined for exportation to Holland. Pharm. Zeitschr. für Russland, and Am. Jour. Pharm., Aug. 1875, p. 348.

*Asafoetida.*—The adulteration of an extra fine variety of this drug, which is known in the East as *hing*, is carried on in Bombay. It is simply mixed with gum arabic by treading the two together. The mixture is then put up in skins so as to resemble the genuine packages. Several qualities are prepared, containing different proportions of gum. The kind of asafoetida usually met with in commerce, which is called

*hingra* by the natives, is adulterated in Afghanistan and Persia by the admixture of some white earthy material. The adulterated gum from Persia is in dirty-white gritty masses, which become very hard when kept. That from Afghanistan is of a brown color, and in small roundish masses, easily crushed into powder by pressure. According to Bellew, gypsum and flour are the adulterants. Pharm. Jour. and Trans., May 29th, 1875, and Am. Jour. Pharm., July, 1875, p. 322.

*Balsam of Tolu.*—Mr. Bernhard Bückle, a pharmacist of Louisville, Ky., has reported to your committee an adulteration of this drug with resin. It had been purchased from a wholesale house in Louisville, and was used in the manufacture of chewing gum, for which purpose it was found to be unfitted on account of its strong resinous taste.

*Beeswax* has been largely sold in the Philadelphia market adulterated with paraffin to the extent of 80 per cent. All of this kind so far met with was moulded into oblong blocks of uniform size, weighing about eight pounds each. They are about fourteen inches long, eight wide, three thick, and they are slightly tapering, so that they may be described as frustra of quadrilateral pyramids. The sophisticated article differs from pure beeswax in being somewhat translucent on the edges, and in being a little sonorous or resonant when it is struck. It may also be recognized by a peculiar concavity on the upper surface of the cakes, while beeswax is either flat or very slightly convex on top, or else has vertical fissures running through the block. The melting-point of wax adulterated to this extent is 146° F., and its specific gravity is .929. The paraffin can be readily separated by heating the wax for fifteen or twenty minutes with commercial sulphuric acid to about 350° F. This carbonizes the beeswax, without affecting the paraffin. The latter may be recovered nearly pure by repeatedly melting it on water, at the same time gently stirring it, so that the carbonaceous matter can subside. Sulphuric acid of the ordinary commercial strength appears to be preferable to the fuming Nordhausen acid, which is gener-

ally recommended in the books for this purpose. The commercial acid was found to carbonize the wax completely without affecting the paraffin, while the Nordhausen acid is stated to decompose a portion of the latter body, for which allowance must be made. *Am. Jour. Pharm.*, Nov. 1874. Beeswax was also met with by the writer, consisting almost entirely of black, earthy matter, which had been neatly coated with handsome yellow wax on the exterior, by repeatedly dipping it into the melted wax. In France, beeswax appears to be sometimes adulterated with Japan wax. Ch. Mène has published a table of the density, fusing-point and congealing-point of mixtures of various proportions of these substances. Unfortunately these tables do not give any satisfactory data for the detection of the adulteration. *Rép. de Pharm.*, 1874, and *Am. Jour. Pharm.*, 1875, p. 66.

*Castor Oil*.—The Tennessee Pharmacal Gazette states that a lot of this was recently found to consist of lard oil and croton oil.

*Cayenne Pepper*.—Out of twenty-eight samples examined in England only four were genuine. Thirteen of the specimens contained red-lead, some of them even in large and poisonous quantities. Vermilion or sulphide of mercury was detected in one sample. The other adulterations were Venetian red, red ochre, brickdust, ground rice, turmeric, salt, and mustard-seed husks. *London Lancet*.

*Chiretta*.—Prof. Bentley has published an elaborate description of a spurious chiretta met with in the London market. It differs from the officinal chiretta in the following characters: The stem is more quadrangular, the scars left by the fallen leaves are less prominent, and the arrangement of the flowers and fruit is less compact. The infusion is distinctly yellowish-brown, while that of the true chiretta is of a somewhat greenish tinge, and of a more intensely bitter taste. *Ophelia angustifolia*, Don, is regarded as the botanical source of this substitute, which is known in India as the *Puharee* (or hill) chiretta. *Phar. Jour. and Trans.*, Dec. 19th, 1874, and *Am. Jour. Phar.*, 1875, p. 71. Dr. Dymock, Professor of

*Materia Medica* at Bombay, writes in reference to this, that it has been known there for a long time as *Meetha chirata* or sweet chiretta. It is received there in the same bales as the bitter kind, from which it is, however, sorted out. He states that it has been very abundant there during the past year, and he expresses his belief that still more will reach the English markets.

*Cottonroot Bark.*—Prof. Maisch exhibited a specimen of a false cottonroot bark at the meeting of the Phil. Coll. of Pharm., Dec. 15th, 1874. It was stated to have been obtained from Georgia, but the true botanical origin could not be ascertained. The false bark is thicker and more brittle than the genuine; it breaks transversely with little difficulty. The interior surface is of a dark-brown or blackish color, while that of the true bark has a whitish or reddish-white color with a silky lustre. *Am. Jour. Phar.*, 1875, p. 11.

*Garlic.*—A lot was received by the writer from North Carolina, which differed materially from the officinal article. It consists of a bud, inclosed in a solid, fleshy mass, resembling a true corm.

*Gum Arabic.*—M. Mussat recommends the use of the microscope to detect admixtures of dextrin. A drop of glycerin is placed on a slide, and sprinkled with the suspected gum. If iodine-water is now added, and the examination is made with a low power, the particles of dextrin will be seen to assume a dirty-red color, whilst those of gum become yellowish. The presence of dextrin can frequently also be recognized by its peculiar odor. *Dr. Circ.*, Sept. 1874, p. 155.

*Gum Mezquite.*—A sophistication, believed to be the Australian or Wattle gum, is reported by the writer in his paper on *Mezquite* presented at this meeting.

*Hemlock Pitch.*—J. A. Schiedt exhibited a factitious hemlock pitch at the meeting of the Phil. Coll. Phar. in March, 1875. It was regarded as a mixture of Burgundy pitch and rosin.

*Herbs and Roots.*—Messrs. Wallace Brothers, of Statesville,

North Carolina, who are extensively interested in the collection of medicinal herbs, have kindly advised your committee of the frequent substitution of the following drugs, which appear to be due rather to ignorance, on the part of both the gatherer and purchaser, than to any fraudulent intentions. The gentlemen state that they often find it difficult to dispose of the correct species, when druggists have for years sold or used a substitute for it, which has been furnished to them either ignorantly or designedly by a gatherer in whom they repose confidence :

*Osmorrhiza longistylis* mixed with *Osmorrhiza brevistylis*.

*Cichorium intybus* substituted for *Taraxacum Dens-Conis*.

*Liatris spicata* substituted for *Helonias dioica*.

*Aletris farinosa* substituted for *Liatris spicata*.

*Gaultheria procumbens* substituted for *Mitchella repens*.

*Apocynum cannabinum* substituted for *Apocynum androsæmifolium*.

*Liatris spicata* substituted for *Eryngium aquaticum*.

*Triosteum perfoliatum* substituted for *Gentiana Catesbæi*.

*Liatris squamosa* substituted for *Liatris spicata*.

*Ascyrum stans* (St. Peter's wort) substituted for *Hypericum perforatum*.

*Ascyrum Crux-Andree* (St. Andrew's cross) substituted for *Hypericum perfoliatum*.

An unknown root substituted for *Gentiana Americana* or *Catesbæi*.

*Honey*.—According to a communication in the Boston Cultivator, most of the so-called strained honey sold by grocers, in bottles, is manufactured by melting cane or other sugar in a decoction of slippery elm bark, or in a solution of gum and starch. Cuban honey and essence, whatever that may be, are stated to be used for flavoring. The composition of the essence is unfortunately omitted. Scientific American, June 27th, 1874. The writer has himself been applied to by manufacturers of honey for glucose, which they wished to add for the ostensible purpose of preventing it from granulating or becoming semi-solid. As glucose can be readily purchased for a little over six cents per pound, it is within

the bounds of probability that it is also added for the more mercenary motive of cheapening the price.

*Horsemint*.—Wallace Brothers advise us, under date of December 8th, 1874, that very little true horsemint (*Monarda punctata*) is sold by botanical druggists. They state that thousands of pounds of the wild basil (*Pycnanthemum incanum*) are consumed as a substitute for it.

*Iron Wire*.—R. Rother asserts that fine iron wire always contains copper, from being repeatedly dipped during its manufacture into a solution of this metal to increase the ductility of the iron. Tenn. Pharm. Gaz., 1875, p. 18.

*Larkspur Seed*.—The writer received a package marked *Sem. Delphinii*, from a very reliable importer, which, on examination, proved to be stavesacre seed (*Sem. Staphisagriæ*), from the *Delphinium Staphisagriæ*. The difference in the appearance of the two seeds is so marked that a fraudulent substitution is not to be thought of. The error most probably arose from the confusion of the botanical names of the two plants, that of the larkspur being *Delphinium consolida*.

*Linden Flowers*.—A substitution of the flowers of *Tilia argentea* for those of *T. parviflora* and *grandiflora* has been noticed in Europe. The former may be distinguished from the officinal by means of their bracts, which are of larger size, and which have a greener color; they are finely reticulate above, and densely covered underneath with stellate hairs, which separate readily, and form a woolly, irritating powder when dry. The flowers have, particularly in the fresh state, an odor reminding of hyacinth and lily of the valley. Schweiz. Wochenschrift f. Ph. and Am. Jour. Phar., 1874, p. 275.

*Linseed oil* is stated to be frequently adulterated with hemp, fish, rosin, and mineral oils. In order to detect fish oil, Aug. Morrell recommends to mix 10 parts of oil with 3 parts of nitric acid, both by weight, to agitate them, and then to leave them at rest until they separate into two layers.

If an admixture of fish oil is present, the oily layer will be dark-brown in color, while the acid layer will assume an orange or dark-yellow color. Pure linseed oil treated in the same manner is changed to a sea-green, and finally into a greenish-yellow color, the acid becoming light-yellow. A mixture of 3 per cent. of fish oil can be discovered in this manner. Rosin oil may be detected by placing ten or twenty drops of pure linseed oil on a porcelain plate, and as much of the adulterated oil by its side. A drop of sulphuric acid slowly forms a dark spot on the pure oil, but on the sophisticated oil it produces very soon a dark, reddish-brown spot, which retains its color for a long time, and has a scum over it. The presence of mineral oils may be demonstrated by saponifying the oil with caustic soda, and after proper concentration treating the soap with ether or benzin; the soap then remains undissolved, but the mineral oil is removed. When hempseed oil is suspected, agitate the oil with *aqua ammoniæ*. Pure linseed oil gives a dark-yellow, thick and homogeneous mass, while the adulterated oil produces a lighter yellow, and granular mass. Drug. Circ., July, 1875, p. 130.

*Lycopodium*.—Scriba describes some lycopodium which was adulterated with French chalk. Hager found in another sample 8.9 per cent. of impurities, consisting of powdered rosin and well-dried potato-starch. Pharm. Centralhalle and Am. Jour. Pharm., 1875, p. 26.

*Matico*.—According to a writer in the Gardeners' Chronicle, it is a matter of considerable uncertainty to which plant properly to attach the name *matico*. It is stated that *Eupatorium glutinosum* is the original matico, while the plant now so called in commerce is in most instances *Artanthe elongata*, the *Piper angustifolium* of older writers. *Artanthe adunca* has also been sometimes substituted. Am. Jour. Pharm., 1875, p. 118.

*Musk*.—In an English lawsuit it was proved that a caddy weighing 19½ ounces, sold as fine Tonquin musk, contained only 6½ ounces of musk, the remainder being earthy matter,



etc. The defence alleged that the purchaser always took upon himself the responsibility of the contents, it being understood that musk was largely adulterated. The Pharmacist, January, 1875; from Med. Press and Circular.

*Mustard.*—W. L. Howie recommends his process for the detection of turmeric, which is almost invariably present in so-called *pure* yellow mustard. The details have been already given in the Proceedings of 1874, p. 310, under the heading of Rhubarb.

*Oil of Almonds.*—We are informed on most excellent authority that the so-called *French* oils of almond, both fixed and essential, are obtained exclusively from peach-kernels.

*Oil of Bergamot.*—We were shown a highly complex formula said to be used by the manipulators in Germany for skillfully reducing this oil. Almost three-fourths of the compound consisted of the oils of orange, copaiba, lemon, a little neroli, and several others. We were informed that large quantities of this sophisticated oil are disposed of in Europe.

*Oil of Ceylon Cinnamon.*—Albert P. Brown found this oil to be adulterated with sassafras and cloves. The oil of the leaves of the Ceylon cinnamon is also frequently sold in place of the true oil of the bark. The former is a brown, viscid, essential oil of clove-like odor; it is sometimes called Heavy Oil of Ceylon Cinnamon.

*Oil of Chinese Cinnamon.*—In order to detect adulterations of fixed oils, rosin oil, etc., Hager recommends to agitate it with an equal volume of petroleum-benzin. A turbid mixture is thus obtained, which after a few hours becomes clear. The above adulterations are soluble in this menstruum, while at a temperature of 5° to 10° none of the oil of cassia cinnamon is dissolved by petroleum-benzin, and not more than 2 per cent. of it at the ordinary temperature. When the pure oil is evaporated at about 240° to 250° C., it leaves a residue of from 35 to 40 per cent., consisting of oxidation-products and cinnamic acid. Pharm. Centralhalle and Am. Jour. Pharm., June, 1875, p. 268.



*Oil of Erigeron.*—A specimen of this oil was sent to the writer by Mr. Joseph L. Lemberger, which was so largely adulterated, that the true odor was entirely overpowered by that of turpentine.

*Oil of Juniper Berries* was offered to the writer by a highly respectable firm of wholesale liquor dealers, who, in their desire to have a really pure and superior article, had themselves imported it direct from Holland, having ordered the very best that was obtainable. As a very much greater quantity had been sent than their order called for, they were anxious to dispose of a portion of it. The gentlemen were so very sure about the absolute purity of their oil, for which they had paid a very liberal price, that they were loath to believe their own eyes when, after agitation with an equal quantity of water, only 20 per cent. of their so-called oil was left, the remainder being alcohol.

*Oil of Lemon*, put up in original cans and genuine imported cases, branded "E. B. & Co.," was found by the writer to contain 25 per cent. alcohol, and 40 per cent. castor oil. Another lot, branded "W. S. & Co.," contained 25 per cent. alcohol. There is every probability that both seals were counterfeit, as the letters composing them were slightly different from those found on the top of genuine cans from Brehmer & Sanderson. The metal on which the seals had been impressed also presented a dull and tarnished appearance, while it is usually perfectly bright and clean.

*Oil of Melissa.*—The oil of lemon-grass, obtained in the East from *Andropogon citratus*, is very frequently substituted for the true oil of melissa, which is distilled in Germany from *Melissa officinalis*.

*Oil of Origanum* rarely reaches this country. A few pounds imported by the writer cost about \$5 per pound. The so-called commercial oil of origanum is obtained in France from *Thymus vulgaris*. The original packages are even distinctly marked *Essence de thym rouge*. As has been already stated, this oil is very frequently mixed with turpentine in large proportion. Its chief consumption is among the manufacturers of patent

liniments, who are totally indifferent as to quality, so they only obtain an original package.

*Oil of Peppermint* was met with also largely reduced with castor oil and alcohol. Twenty-six pounds of this adulterated oil yielded, when distilled by the writer,  $8\frac{1}{2}$  pounds of pure oil, about a gallon of castor oil remaining in the still. The proportion of alcohol, which had been present, is represented in the loss.

*Oil of Rose Geranium* is now so frequently substituted by the ginger-grass or palma rosa oil, obtained from *Andropogon Schœnanthus*, that it is somewhat difficult to procure the true oil of *Pelargonium odoratissimum* or *Radula* in commerce.

*Oil of Sassafras* was purchased by the writer from a party who represented that he had personally distilled it, and was found on evaporation to leave a residue of 14 per cent. of rosin.

*Oil of Verbena* is almost out of the market, being everywhere substituted by the oil of lemon-grass, *Andropogon citratus*.

*Oil of Wintergreen* was offered to the writer by a tall Jerseyman, who professed to have distilled every drop of it himself, and who therefore claimed to be able to guarantee its absolute purity, which proved to contain just two-thirds of its volume of alcohol. It is somewhat remarkable that even this large proportion of alcohol could scarcely be recognized by the senses, and that, as far as could be judged by the taste and smell, this was an unusually fine specimen of oil of wintergreen. Several other lots have been met with containing various proportions of oil of sassafras.

*Oil of Wormseed*.—Joseph L. Lemberger has favored us with a specimen of this oil, smelling very strongly of rancid turpentine.

*Oil of Wormwood* has been met with extensively mixed with turpentine.

*Olive Oil* is largely substituted by some of the cheaper fixed

oils found in this market. Very little of that which is sold by grocers is even imported from Europe. A New York merchant, who is extensively engaged in bottling this article in imitation of the imported style, informed us that for the cheapest grade, he is in the habit of putting up refined cotton-seed oil, and for a somewhat better brand the oil of benne. The expressed oil of mustard, a by-product in the manufacture of table mustard, is also applied to the same purpose. Our French friend, whom we have before alluded to, also kindly informed us that in his country the groundnut oil (*Arachis hypogæa*) is used to an enormous extent for admixture with olive oil, so that but very little of the latter is exported strictly pure.

*Opium.*—A paper has been published on the adulterations of opium by Dr. Alexander Christison, Assistant Inspector of the East India Opium Manufactory at Ghazipur, giving a number of practical rules for their detection. An adulteration with an extract or decoction of green poppy-heads may be detected by the color and odor, and by the smoothness of the opium when rubbed upon a porcelain plate. When poppy petals have been used, the smell of the opium is sour and disagreeable. When tobacco or any of its preparations have been used, the peculiar odor will become apparent on slightly heating the opium. Catechu and other astringents may be detected by exhausting the opium with boiling water, filtering through paper, and testing the filtrate with ferric chloride. When gum has been used, the addition of strong alcohol to a concentrated infusion will produce a flocculent precipitate. The addition of flour changes the general appearance of the opium but very little; but a decoction cannot be filtered through paper, and the addition of iodine shows the presence of starch. Bruised potatoes are shown by the same test, and lumps can be made visible by rubbing down the opium on a porcelain plate with a little water. Sugar may be detected by the frothing of the decoction when shaken, and grape-sugar by Trommer's test. Charcoal, calcic carbonate, sand, mineral, and earthy matters, may be recognized by smoothing a little of the moistened opium on a glazed white sur-

face with the point of the finger, or by separating these insoluble impurities by means of boiling water. The admixture of fragments of vegetable fibre, cloth, paper, leather, etc., becomes evident to the sight and touch when rubbed down with the finger on a plate, and the character of the adulterant in these cases can generally be determined by the magnifying-glass. *The Pharmacist*, February, 1875, p. 34.

*Opopanax*.—M. J. H. Marais presented to the Phar. Soc. of Paris a specimen of false opopanax, which was composed entirely of myrrh. *Am. Jour. Phar.*, 1875, p. 39.

*Pepper*.—According to Mr. J. Bell, of London, linseed meal, mustard-seed husks, rice, bean, and pea meal, as well as the flour and bran of the ordinary cereals, are, in England, the most common adulterants of ground black and white pepper, ground chillies being added to restore the pungency. Some of these substances can be readily detected by diffusing the pepper in water, and then pouring the mixture on a muslin sieve. The deep-red particles of chilli can then be recognized, and also the camphor-like fragments of rice. The mustard husks are known by their cuplike shape, while the smooth, shining appearance of the flaxseed readily distinguishes it from the dull brown of the pepper. *Scientif. Amer.*, 1874, p. 197.

H. Pocklington found a number of specimens largely adulterated with such articles as starch, farina, pea-meal, rice-starch, and oatmeal. A lot supplied by a "respectable" spice-grinder to a pharmacist, under a special warranty that it was genuine, was found to contain 60 per cent. of adulterations. The admixtures are easily detected by the microscope, the examination being facilitated by slightly moistening the pepper. *London Phar. Jour.*

*Pinkroot*.—S. W. Brown, of Manayunk, Philadelphia, has favored your committee with a specimen of a false pinkroot, received by him from a respectable source. The specimen agrees precisely with a sample of so-called East Tennessee pinkroot, which we obtained from a commission merchant of our city, who receives large consignments of crude drugs from the South. He was of the opinion that it was a true

pinkroot, and he accounted for the marked difference in appearance by variety of soil, age of the roots, etc. Large amounts of this root had been sold by him to wholesale druggists and manufacturers of fluid extracts, many of whom preferred it on account of being cleaner than the regular pinkroot. We addressed a letter of inquiry concerning this subject to Messrs. Wallace Brothers, of Statesville, North Carolina, inclosing a specimen of the root. They have replied that the *Spigelia marilandica* does not grow in any abundance in East Tennessee, but that a plant similar in appearance is often gathered there for pinkroot. They state positively that the specimen sent to them is not pinkroot, but that the same root has been frequently offered to them as pinkroot, as it grows abundantly also in their neighborhood. They have since been able to identify the sample as the root of the *Phlox Carolina*, known with them as the Carolina pink. It is just possible that the confusion of the common names first paved the way for this sophistication, as the country people would naturally feel justified in sending out the root of their Carolina pink under the name of pinkroot. It is even possible that it may possess some slight virtues as an anthelmintic, as one of the manufacturers, who made a fluid extract of this root, has informed us that he convinced himself of its effects by actual trial. The rootlets of this phlox are all nearly straight or slightly curved, while those of *spigelia* are very much contorted, and bent into numerous obtuse angles. There is a much greater uniformity in the diameters of the phlox radicels than in those of the *spigelia* radicels. The false pinkroot is entirely free of stems, which are often found attached to the true pinkroot. The epidermis of the phlox radicels is easily detached by a little rubbing, exposing a smooth, straw-colored ligneous thread, differing in this respect from *spigelia*. The false pinkroot has been neatly prepared, being free from dirt, feathers, and other adhering impurities, so that it looks much handsomer, and somewhat lighter in color, than the genuine.

*Prepared Oystershell.*—E. Heintz found some of this in the

German drug market, which consisted entirely of burnt bones. *Archiv der Phar.*, 1874, p. 142.

*Resin Guaiac.*—L. C. Hogan found in different specimens of this drug respectively 20, 25.7 and 21 per cent. of impurities. *The Pharmacist*, Sept. 1874, p. 259.

*Saffron.*—The firm of Brierre Fils, Pithiviers, France, has published a circular in reference to the adulteration of saffron. They state that a very frequent adulteration is an admixture of from 30 to 40 per cent. of calendula flowers, dyed with Campeachy wood, and known in that state as "*feminelle*." To detect this adulteration moisten a few flowers, and rub them singly on white paper. The genuine flowers will give a fine, rich yellow color, while the *feminelle* will only yield a violet or reddish hue. When the true saffron is macerated in distilled water it will retain its fine red color for many hours, while the *feminelle* will lose their artificial tint within a short time. A still more general method of adulterating saffron consists in adding honey and baric sulphate to the genuine flowers, thus increasing the weight from 10 to 30 per cent. A really handsome appearance is given by further treatment with anilin, but after a time the honey changes the color into a dull shade, and the flowers become sticky. To detect this adulteration put a pinch into a tumbler of distilled water, and agitate for a few minutes. The adulterated saffron will at once turn the water cloudy; even small particles of dust may be seen falling to the bottom; when the water is carefully poured off, a slimy, sandlike mass will be left. When, however, the saffron is entirely pure the water will remain clear, becoming tinged to a bright-yellow color, which will vary in intensity according to the quality of the flowers. Five to ten minutes will suffice for these experiments. Julius Müller also reports, in the *Archiv der Pharmacie*, having met with saffron adulterated with 25 per cent. of calcic carbonate, besides another lot containing 9 per cent. of baric sulphate.

*Sanguinaria.*—F. X. Crawley of St. Louis has kindly sent us a sample of whole turmeric root, which he had received

from a wholesale house of that city as bloodroot. The most remarkable feature of the case is that the parties furnishing it insist on its being sanguinaria, and that a prominent botanical druggist of the Mound City supports them in their opinion. This latter circumstance seems so peculiarly aggravating as to warrant bringing the matter before the St. Louis College of Pharmacy for general discussion.

*Scammony*.—Thomas Greenish has examined powdered virgin scammony microscopically, and found every sample of it to contain more or less of scammony starch, with occasionally a little wheat starch in addition, while the lump virgin scammony was in every instance free from starch of every kind. He accounts for this apparent anomaly on the supposition that the poorest pieces of scammony are chosen for powdering, or inferior varieties mixed in. *Am. Jour. Phar.*, 1875, p. 28.

*Seneca Root*.—M. Patrouillard presented a paper to the *Phar. Soc. of Paris* on the substitution of seneca root by the root of an *asclepias*.

*Senna*.—E. M. Holmes has read a paper on a drug offered for sale in London as a "fine senna," which he ascertained to have been obtained from *Cassia brevipes*, D. C. He found it to be destitute of purgative properties in doses of half an ounce, so that it cannot take the place of the officinal senna. His paper is accompanied by illustrations, which will prove very useful in identifying the leaves if they should be offered in this country. One of the most easily recognized features is the short, very hairy pod, which is covered with golden-yellow, erect hairs. *Phar. Jour. and Trans.*, Feb. 6th, 1875, and *Am. Jour. Phar.*, May, 1875, p. 215.; also p. 211 of this volume.

*Serpentaria*.—P. J. Milleman states he received from one of the wholesale houses of Chicago a lot of serpentaria, containing in one pound over two ounces of golden-seal root.

*Storax*.—In order to detect an adulteration of crude turpentine in liquid storax, Hager recommends to fuse it in a test-tube by means of a water-bath, and then to agitate it



with half its volume of absolute alcohol until dissolved. This is then to be thrice shaken up with several times its volume of benzin. The decanted benzin solutions are united, and evaporated in a water-bath from a tared vessel. The residue should weigh 45 to 55 per cent. of the storax; it should have a bluish opalescence, and an agreeable odor. If turpentine is present the residue will be yellowish, with an odor of turpentine, and its weight will be greater than that stated above. *Phar. Centralhalle*, 1874, No. 21.

*Sugar*.—Ultramarine is occasionally used to conceal the yellow shade of inferior grades of sugar, giving them a clear white appearance. A communication from a New York refiner admitting the use of this substance is published in the *Am. Jour. Pharm.*, Aug. 1875. The writer himself, several years ago, purchased two or three hundred weight of ultramarine from a sugar refiner who was about to abandon its use. S. P. Sharples, State Assayer of Massachusetts, states that he has been shown an article prepared from rice, which was not to be distinguished from granulated sugar by color or general appearance. He was informed that this article was used for adulterating a particular grade of granulated sugar used by confectioners in the West.

*Taraxacum*.—Fred. F. Prentice, of Janesville, Wis., has sent us a specimen of cultivated chicory root, of which he obtained ten pounds from a wholesale house of Chicago. Like their *confrères* of St. Louis, in the case of the sanguinaria, these gentlemen insist on its being an unusually handsome specimen of taraxacum, specially selected for their trade. Attention was called to this fraud in 1873 by Prof. Maisch, and it is mentioned in the Proceedings of that year. The chicory can be easily distinguished from dandelion by the absence of the brownish circles of laticiferous vessels on the cross-section.

*White Ginger*.—M. Patrouillard mentions having met with a false white ginger, which had been artificially bleached and whitened with lime. The ginger is of a dull white color, and is not striated longitudinally like the genuine. It is covered with a white dust, which can be readily detached. It is



claimed that this false white ginger is much less active than the genuine, and that it has a very much lower commercial value. Pharm. Jour. and Trans., April, 1874, and Am. Jour. Pharm., 1874, p. 562. Ginger prepared in the manner described is also very frequently met with here. No doubt the fault lies partially with the purchasers, who will insist on a handsome white exterior appearance, without taking the trouble to investigate the deterioration of quality and strength which inevitably results from this whitewashing.

#### CHEMICALS AND PHARMACEUTICAL PREPARATIONS.

*Ammonia*.—Dr. G. C. Wittstein states that nearly all the commercial ammonia contains small quantities of anilin, toluidin, etc. In the purification of gas liquor, these compounds enter with the ammonia into all other combinations. Their presence may be recognized in *liquor ammoniæ* by the color of their oxidation-products. When nitric acid is partially neutralized by such ammonia, a rose or a still darker red color is produced, which disappears again on the further addition of ammonia to supersaturation. If the ammonia is at once added in excess, this coloration is not observed. Dingl. Polytechn. Jour., Sept. 1874, and Am. Jour. Pharm., 1875, p. 64.

*Anilin Colors*.—The contamination of these with arsenic has previously been frequently noted. A. Husemann, a recent author on the subject, regards arsenic in combination with anilin even infinitely more dangerous than in its free state or in combination with other bases. He suggests that this may be due to the intimate contact of these colors with the animal tissues. He reports the cases of several children, who had been poisoned by eating cakes colored with red anilin. After death, only very minute traces of arsenic could be detected. The anilin was found to contain  $2\frac{1}{2}$  per cent. of arsenic acid, and it was ascertained that the cakes which were eaten could not have contained more than from one-tenth to one-fifth of a milligramme of the poison. Ann. d. Chem., Vol. 175, p. 219, and Am. Jour. Pharm., May, 1875, p. 210. Dr. Springmühl

found twenty-four out of twenty-five specimens of magenta red to contain arsenic, some of them as much as 5 to 6 per cent. Anilin is also extensively adulterated with sugar and oxalic acid; 50 per cent. of the former and 25 per cent. of the latter have been found to be present. All the colors are said to be adulterated, but green, blue, violet, and the various reds to a greater extent than the rarer colors. Tenn. Pharm. Gaz., March 17th, 1875. Hair-oil colored with anilin red is reported to have produced a disagreeable itching eruption of the scalp, similar to that caused by arsenic. The Laboratory and Drug. Circ., July, 1875, p. 134. Another observer has noticed a similar annoyance resulting from wearing hats, the linings of which were dyed with anilin colors.

*Calcic Bromide* has been met with by Prof. Maisch, which had been whitened by the addition of lime, resulting in the formation of a basic salt with a strong alkaline reaction. Am. Jour. Pharm., 1874, p. 13.

*Chloroform*.—C. Remys states that all commercial chloroform contains fusel oil. Jour. Chem. Soc., May, 1875; from Arch. Pharm.

*Chromic Acid*.—Brewer Bros., of Monmouth, Ill., have sent us a piece of broken glass found with several others in chromic acid. The impurity, which was probably accidental, constituted 17 per cent. of the acid.

*Cincho-Quinine*.—This preparation has been subjected to a series of very elaborate and accurate chemical examinations by Professors Emil Scheffer and C. Lewis Diehl. The authors arrive at the following conclusions as the results of their exhaustive qualitative and quantitative analyses: Cincho-quinine is composed mainly of cinchonia. It contains less than 1 per cent. of the alkaloid quinia. It contains less than 5 per cent. of the alkaloid quinidia. Cinchonidia is either absent, or present only in very small quantities. It contains traces of sulphate of ammonium. It is not an alkaloidal representative of cinchona bark. The authors question the veracity of the circulars accompanying the preparation, as the proprietors therein claim that cincho-quinine contains no

substances but those found naturally existing in bark, since they have proved it to contain sulphuric acid and sulphate of ammonium. Also, on account of the statement there set forth that cincho-quinine contains the pure alkaloids without acid combinations, while the authors demonstrated that it does contain a portion of the alkaloids in acid combinations, chief among which is sulphate of cinchonia. *Am. Jour. Pharm.*, April, 1875. Prof. Maisch, in an editorial answer to a communication from the manufacturers, regards cincho-quinine as an arbitrary mixture of the four cinchona alkaloids, and concludes that its therapeutical value is fully represented by mixing sulphate of cinchonia with about 2 per cent. each of the sulphates of quinia, quinidia, and cinchonidia. *Am. Jour. Pharm.*, May, 1875, p. 204.

*Citrate of Iron and Quinia of so-called "English Style."*—L. C. Hogan obtained from three specimens of this preparation respectively 2.7, 4, and 5.12 per cent. of quinia, while both the U. S. and British Pharmacopœias prescribe a salt containing 16 per cent. of quinia. Notwithstanding this wide discrepancy the descriptive catalogue of the manufacturers stated that the formula of the most reputable English manufacturers had been adopted for this preparation. *The Pharmacist*, Aug. 1875, p. 225.

*Citrate of Magnesium.*—William Schrage has made an examination of magnesium and other effervescing citrates and tartrates, with the following results: H. W. Swift & Bro.'s "Effervescing Citrate of Magnesia" consists of sodium carbonate, sodium tartrate, tartaric acid, a trace of sulphuric acid, and the usual proportion of sugar, water, etc., but is entirely devoid of citric acid and magnesium. Nichols & Co.'s "Effervescing Citrate of Magnesia" is composed of magnesium sulphate, sodium carbonate, tartaric acid, sugar, water, etc. Billings, Clapp & Co.'s "Magnesia Aperient" contains magnesium sulphate, sodium carbonate or bicarbonate, potassium bicarbonate or sodio-tartrate, tartaric acid, and sugar. W. J. Gordon's "Citrate of Magnesia" was found to be a neutral magnesium citrate, dissolving with difficulty. Tarrant's "Effervescing Seltzer Aperient" con-

sists of magnesium sulphate, sodium bicarbonate, potassium bicarbonate, tartaric acid, and sugar. Charles Ellis & Co.'s "Prepared Citrate of Magnesia" contains magnesium citrate, sodium bicarbonate, citric acid, sugar, and a trace of potassium salt. Am. Jour. Pharm., and The Pharmacist, March, 1875. F. A. Reichardt states, that he obtained magnesium citrate from four pharmacies, having the highest reputation in New York, and found three of the bottles to contain lead in appreciable quantities, while the fourth was a solution of sodium citrate. Drug. Circ., Sept. 1874, p. 155.

*Citric Acid.*—We have positive assurance that the crystallized tartaric acid has been frequently sold in lieu of citric acid, particularly among the bottlers of mineral waters, ginger ale, etc. The difference in price between these two acids is so great, that some of the Cheap John's who supply these manufacturers, have been unable to resist the temptation of labelling tartaric as citric acid.

*Cream of Tartar.*—S. P. Sharples, State Assayer of Massachusetts, in examining a specimen of cream of tartar, found 2 or 3 per cent. of gypsum with a considerable amount of rice flour. As the gypsum was not in sufficient quantity to pay for its addition as an adulterant, he was puzzled to account for its presence. On further investigation, he ascertained that an adulterated article of rice flour, containing from 15 to 20 per cent. of gypsum, was on the market. The manipulator, wishing to buy his rice flour as cheaply as possible, had bought the adulterated article. Boston Jour. Chem.

*Elixir of Quinia, Bismuth, and Strychnia.*—Sophus Sørensen, of Meadville, Pa., has furnished us with an analysis of this preparation, obtained from a New York firm advertising largely amongst physicians. The label stated that each ounce contained 8 grains of quinia, 4 grains ammonio-citrate of bismuth, and  $\frac{8}{100}$ ths of a grain of strychnia. The bottle was found to contain only  $14\frac{1}{2}$  fluid ounces of elixir. Two fluid ounces were carefully evaporated to one ounce to expel the alcohol. Ammonia was added and the mixture was thrice shaken with ether. The mixed ethereal solutions were

allowed to evaporate spontaneously from a tared capsule; 5.4 grains of impure alkaloids were obtained, which were dissolved in water acidulated with sulphuric acid. The solution was filtered and precipitated by caustic soda. The precipitate, after being collected on a tared filter, washed with cold water and dried, weighed but 5.1 grains, while 16.16 grains were claimed. In a second experiment with the same elixir it was precipitated with caustic soda. The precipitate was collected on a tared filter and redissolved in acidulated water. The solution was filtered and again precipitated with soda. There was a difference of about 0.2 grain in favor of the first analysis.

*Ergotin.*—James R. Mercein examined three samples of Merck's ergotin, finding in them respectively 45, 46, and 60 per cent. of gummy extractive matter, which was insoluble in water. The Pharmacist, Sept. 1875, p. 257.

*Extract of Vanilla.*—A sample of an artificial extract of vanilla was sent to the writer by Prentice & Sherwood, of Janesville, Wis., with the information that it was offered to them at the rate of \$6 per gallon. It was found that a preparation with a somewhat similar odor and flavor could be obtained by percolating a mixture of benzoin, tonka, and balsam Peru with rectified spirit and glycerin.

*Formic Acid.*—E. Heintz found this to be only 1.12 sp. gr., while it should be 1.2. The article was therefore worth only one-third of its pretended value. Arch. d. Pharm., 1874, p. 142.

*Impure Carbolic Acids,* sold as containing 50 per cent. of acid, yielded only 15 to 25 per cent. when examined by E. Heintz. Another sample, sold as containing 60 per cent., furnished but 35 per cent. Arch. d. Pharm., 1874, p. 142.

*Iodoform Pills.*—Sophus Sørensen has examined two lots of these for your committee of last year. In one instance he found ten one-grain pills to contain 5.9 grains, in the other 9 grains. He triturated the pills until reduced to a fine powder, which he washed with successive portions of ether, in all

amounting to  $1\frac{1}{2}$  fluid ounces. The filtered solution was allowed to evaporate spontaneously to dryness in a tared capsule. Ten grains of iodoform subjected to the same treatment, with the object of ascertaining the loss by evaporation, yielded 9.4 grains, leaving 0.45 grains of insoluble matter on the filter. The first sample was of New York manufacture, the second of Western.

*Kanawha Salt, No. 1.*—Prof. Emil Scheffer, of Louisville, found 3.88 per cent. of barium chloride in a sample of this salt. He could not determine whether this was a natural constituent of the salt, or whether it was due to an attempt on the part of the manufacturers to remove calcium sulphate by means of barium chloride. *Am. Jour. Pharm.*, June, 1874, p. 247.

*Peroxide of Barium.*—Tartar emetic is reported as a sophistication of this chemical. *Tenn. Pharm. Gaz.*, Jan. 27th, 1875.

*Potassium Chlorate.*—Lead has been repeatedly detected in this salt by A. Hilger. Its presence is readily proven by the black precipitate with sulphuretted hydrogen, and the yellow precipitate with chromate of potassium. Its complete removal may be effected by repeated crystallization from water. *Archiv der Pharmacie*, 1875, p. 391, and *Am Jour. Pharm.*, 1875, p. 304.

*Quinia Pills.*—Eight analyses of these by L. C. Hogan and two by Dr. A. B. Lyons, showed that five so-called two-grain pills from different manufacturers contained respectively only 9.22, 8.98, 8.91, 8.19, 7.63, 7.22, 6.32, 5.56, 5.93, and 5.2 grains of sulphate of quinia. Four of these contained cinchonia in addition, and two cinchonidia. One sample dissolved so slowly that it was deemed probable that this lot had been overheated. *Detroit Rev. of Pharm. and Med.*, June, 1875; *Am. Jour. Pharm.*, July, 1875; *The Pharmacist*, May, 1875. Henry Trimble examined seven specimens of sugar-coated quinia pills from leading druggists of Philadelphia. Five of these contained the amount of quinia claimed for them, though several had the disadvantage of difficult solubility. The sixth contained only 70 per cent. of the proper amount

of quinia, and the seventh was pure muriate of cinchonia. Am. Jour. Pharm., 1875, p. 163. Sophus Sørensen also reports two analyses of his own to your committee. Both samples were of New York manufacture. He obtained from ten one-grain quinia pills 3.85 grains of quinia and quinidia, and from five two-grain pills 4.7 grains of the same. Sugar-coated quinia pills have been sold quite extensively in our market, which were made from the famous false French quinia, *i. e.*, muriate of cinchonia, without containing a trace of the true alkaloid. They have generally been sold in bulk, though they have been repeatedly represented as the product of reliable manufacturers. The party offering them to the writer stated that he had disposed of 45,000 of them, and that he would guarantee them to be made from sulphate of quinia, *to the best of his knowledge*.

*Santonin*.—Prof. Maisch reports a substitution of picric acid for santonin. The substance was examined and determined by W. L. Harrison, of Petersburg, Va., at the laboratory of the Philadelphia College of Pharmacy. Am. Jour. Pharm., 1874, p. 52.

*Sodium Phosphate*.—Dr. A. B. Lyons has recently met with this salt bearing the label of a reputable American manufacturer, containing a large percentage of sodium sulphate. The salt appeared to have been obtained by simply evaporating the mother liquor to dryness. It was soluble in twelve times its weight of water, while pure crystallized sodium phosphate requires at least sixteen times its weight. At a moderate heat it lost only 25 per cent. of water of crystallization, instead of 60 per cent., the proper amount. On ignition, about 2 per cent. more was lost, while the disodic hydric phosphate should lose more than twice that quantity of basic water. An aqueous solution yielded, after the addition of hydrochloric acid, an abundant precipitate with barium chloride. By a rough volumetric estimation, the amount of sulphuric acid was found to be about 27 per cent. of the entire weight, so that the salt contains more than half its weight of sodium sulphate. Detroit Rev. of Med. and Pharm., July, 1875, p. 440.



*Sulphate of Morphia Suppositories.*—Sophus Sørensen advises us that he dissolved four one-grain sulphate of morphia suppositories, of Philadelphia manufacture, in ether, collected the precipitate on a tared filter, washed it with ether, and, having dried it, found it to weigh only three grains.

*Sulphate of Quinia* is reported to have been found in London containing one-third carbonate of sodium. Another sample, which had been exported to India, contained no trace of any of the cinchona alkaloids, according to the analysis of Howards & Sons. It was furnished with a French label, but without any manufacturer's name. *Chemist and Druggist*, Jan. 15th, 1875, pp. 18 and 25. At the meeting of the New Jersey Pharmaceutical Association Prof. Bedford called attention to the substitution of muriate of cinchonia for quinia. He stated that the firm of Tallmadge & Co. had sold thousands of ounces of muriate of cinchonia with Pelletier's labels as sulphate of quinia. *The Pharmacist*, Dec. 1874, p. 357.

*Syrup of Ferrous Iodide.*—Max Tschirner examined samples of this, obtained from various retail stores of San Francisco, and found them to vary in containing from ten to forty-six grains of iodine to the fluid ounce. *Amer. Jour. Pharm.*, 1875, p. 251.

#### MISCELLANEOUS SUBSTANCES.

*Beer.*—Dr. G. C. Wittstein has published a valuable treatise on the detection of adulterations in beer in the *Archiv der Pharmacie* for January, 1875. He indicates convenient methods for ascertaining the presence of the various substances which might be used as substitutes for hops or malt, though he does not assert that such adulterations are practiced. He includes soda, potash, glucose, bogbean, gentian, wormwood, quassia, aloes, colocynth, colchicum, cocculus indicus, nux vomica, and picric acid. A condensed reprint is published in the *American Journal of Pharmacy* for June, 1875, p. 262. An equally elaborate essay on the same subject has been published in the *Archiv der Pharmacie* (1874) by Dr. Dragendorff, Professor at the University of Dorpat. An



abstract is to be found in the Chemist and Druggist, of London, for Jan. 15th, 1875.

*Bromochloralum*.—Dr. Lyons states that 1 fluid ounce of this preparation contains approximately  $45\frac{1}{2}$  grains aluminium chloride, 28 grains calcium chloride,  $1\frac{1}{2}$  grains magnesium bromide, 5 grains sodium chloride, and 1 grain calcium sulphate. Detroit Rev. of Med. and Pharm., June, 1875, and Am. Jour. Pharm., July, 1875, p. 307.

*Chow-chow*.—Aconite root is mentioned as an ingredient used by a Chicago manufacturer, added for the purpose of imparting to it a peculiar piquancy. Med. Record and Drug. Circular, Jan. 1875, p. 36.

*Crab Orchard Salts* have been stated to be largely adulterated with Epsom salt, and in one case to have been manufactured entirely from Epsom salt and iron sulphate. Amer. Jour. Pharm. 1874, p. 38.

*Elixir of Iodobromide of Calcium Compound*, according to Dr. A. B. Lyons, contains the same ingredients as the solution of the same verbose name, the composition of which is given below (p. 524). The elixir is weaker in saline constituents, and has an addition of sugar, liquorice, sassafras, and other flavors. Detroit Rev. Med. and Pharm.

*Essence of Coffee*.—This wonderful essence, of which enormous quantities are sold, is made exclusively by heating the very cheapest grades of molasses until they are thoroughly converted into caramel. It of course contains all the impurities of the molasses, and generally more or less charcoal from being burned too much. Before being sent out, it is first crushed in breakers, and then ground into a coarse powder. Its chief function seems to be to give the coffee a deep, rich tint, so that this has the appearance of being quite strong, even when only a very moderate amount of the beans have been used.

*Milk*.—Professors Zöller and Rissmüller state that while large, medium-sized, and small round butter-globules under the microscope appear to fill normal milk, they seem much less crowded in milk diluted with water, varying in this

respect in accordance with the degree of the dilution. The presence of only medium-sized and small globules indicates that the milk has been skimmed after standing for a short time, while milk skimmed after twenty-four hours exhibits separate groups of the small globules only. By standing for four hours under favorable conditions, at a temperature of  $64^{\circ}$  to  $68^{\circ}$ , milk parts with 48 per cent. of its fatty matter, and after twenty-four hours with as much as 88 per cent. The cream in the first case consists chiefly of the larger globules, and is poor in fatty matter; that in the latter case contains also the greater part of the medium and small globules, and double the fatty matter. Harper's Bazar.

*Lemmel's Butter Powder* was found by Fuchs to consist of impure sodium bicarbonate, colored with turmeric. *Industrieblätter von Hager and Jacobsen*, p. 373.

*Lozenges and Confectionery*.—J. M. Merrick has examined these, and found a series which were colored with salts of arsenic, copper, antimony, and lead. He also detected flour and plaster of Paris used as adulterants. One sample of yellow lozenges contained 1.1 per cent. of antimony. Some bright colors are due to the presence of anilin dyes, which may be poisonous *per se*, even when made without the use of arsenic. He concludes that from one-third to one-half of the colored confectionery sold owes its color to injurious pigments. Report of the Board of Health of Boston.

*Palm Oil*.—Dr. Charles A. Cameron, Analyst to the city of Dublin, reports extensive adulterations of this oil with water, horse oil, and other substances. *Drug. Circ.*, November, 1874, p. 191.

*Persian Insect Powder* is largely adulterated. The writer has been advised by the representative of a very large European drug house that it is their custom to grind up and mix in with it any old stocks of either German or Roman chamomile flowers that may accumulate on their hands. A convenient physiological test for the quality of this insecticide is given by H. Kalbruner in the "*Zeitschrift des Oestreich. Apotheker Vereins*," 1874, No. 29. According to him, four

grains of insect powder of good quality, when sprinkled upon a fly confined in a vial, should produce stupefaction in one minute, and death in two or three minutes. He states that few commercial insect powders come up to this standard, and that most of them require fifteen to thirty minutes to kill a fly. *Am. Jour. Pharm.*, 1875, p. 25.

*Port Wine.*—Robert Bulwer, English secretary of the legation at Lisbon, states that all the port wine exported to the English market is prepared from equal parts elderberries and grapes, and that brandy is always added in the proportion of three to sixteen gallons to every pipe of one hundred and fifteen gallons. *Drug. Circ.*, January, 1875, p. 30.

*Soap.*—S. P. Sharples, State Assayer of Massachusetts, has ventilated the adulteration of this commodity. For detecting water, an excessive amount of which is frequently incorporated, he recommends to dry the soap first at a gentle heat, and then at 212° F., having previously reduced it to fine shavings. Rosin, of which sometimes 75 per cent. is used, can be recognized by its odor. Some of the manufacturers boast of using as much as 65 per cent. of ground talc or marble dust, exclusive of the rosin. When too much sodic carbonate or sulphate has been used, an efflorescence is apt to appear on the soap. The carbonate may be recognized by effervescence with acids; the sulphate by giving a precipitate with baric chloride. A good hard soap should not contain over 20 per cent. of water; it should dissolve completely in hot water, giving a fluid that is nearly clear and free from disagreeable odor. *Boston Jour. Chem. and Drug. Circ.*, June, 1875, p. 117.

*Spanish Wines* are imitated on a very extensive scale by means of the cheap wines grown in the south of France. These wines contain scarcely 11 per cent. of alcohol, but with the addition of syrup of mulberry and alcohol the strength is raised to 21 per cent. At a recent session of the International Viticultural Congress at Montpellier, M. Saint Pierre, a professor in the medical college of that city, frankly pleaded for the encouragement of this special industry. The members of the

Congress visited Cette and Mèze, and inspected several manufacturing factories. Cette alone is stated to make nearly 8,000,000 gallons per annum, worth about 15,000,000 francs, two-thirds of which is consumed in America. Jour. Appl. Science, Aug. 1st, 1875; and Am. Jour. Pharm., Sept. 1875, p. 425.

*Solution of Iodobromide of Calcium Compound* has been again analyzed. Dr. A. B. Lyons gives the approximate composition of one fluid ounce as follows: Anhydrous calcium chloride, 142 grains; magnesium chloride, 30 grains; sodium chloride, 18 grains; magnesium bromide, 6 grains; potassium iodide,  $1\frac{1}{2}$  grains. The investigator figures up that five cents a bottle would be about a reasonable compensation for the materials. Detroit Rev. of Pharm. and Med.

*Spices.*—We trust the Association will pardon us for introducing the following gratuitous advertisement, extracted from the price-list of a New York spice broker, which will tell its own story: Almond shells, powdered, 4 cents; cocoanut shells, ground,  $3\frac{1}{2}$  to 4 cents; allspice mixture, 4 to 5 cents; cassia mixture, 4 to 5 cents; clove mixture, 4 to 5 cents; ginger mixture,  $3\frac{1}{2}$  cents; mace mixture, 6 cents; mustard mixture, 5 to 6 cents; red pepper mixture,  $5\frac{1}{2}$  to 6 cents; black pepper mixture, 3 to  $3\frac{1}{2}$  cents per pound.

*Stearin.*—In order to determine an adulteration of paraffin in this, M. Donath directs to boil 6 grams of the sample for half an hour with 200 to 300 c.c. of potash lye, sp. gr. 1.15, and then to precipitate by calcic chloride. If a large proportion of paraffin is suspected, sodic carbonate is to be used in addition to the calcic chloride. Calcic carbonate is thereby formed, rendering the precipitate more easy to pulverize. The lime-soap, with which the paraffin is entangled, is washed on a filter with hot water, and dried at  $100^{\circ}$ . The mass is then pulverized and exhausted in a displacement apparatus with essence of petroleum. The solution is evaporated, and the residue after being dried at  $100^{\circ}$  is weighed as paraffin. When operating on known mixtures the author obtained results correct to 0.3 per cent. Moniteur Scientif.

*Tea.*—The leaves of *Epilobium angustifolium* are extensively used in Russia for the adulteration of tea. Exhausted tea leaves are often mixed with these leaves and sold as tea. The leaves are also exported for the same purpose. They yield a darker infusion than the same weight of tea leaves, in which alcohol produces a mucilaginous precipitate, while it does not affect the infusion of tea. Softened by water and unfolded, they can be readily distinguished from true tea leaves. Pharm. Zeitschr. f. Russland and Am. Jour. Pharm., August, 1875, p. 348.

*Vinegar.*—Jaillard reports several cases of poisoning, accompanied by weakness, headache, diarrhoea, and vomiting, the causes of which were traced to the use of a lot of vinegar, in 100 parts of which he found 3.2 parts of zinc acetate. The vinegar had been kept for some time in a zinc vessel. Rép. de Pharm. and Am. Jour. Pharm., September, 1875, p. 396.

*Walker's Vinegar Bitters.*—The State Assayer of Rhode Island reports this nostrum to contain 7.5 per cent. of alcohol, so that the violent philippics issued by the proprietor in favor of total abstinence are reduced to mere farces. Drug. Circ., September, 1874, p. 164.

*Wine and Vinegar.*—M. Fordos cleaned some wine-bottles by shaking them with shot in the usual manner. He filled four of them with different kinds of wine and vinegar. After several days he discovered lead in each of these liquids. Bulletin de la Société Chimique de Paris, December 5th, 1873.

Respectfully submitted by

ADOLPH W. MILLER, *Chairman*,  
JAMES R. MERCEIN,  
M. L. M. PELXOTTO.

## REPORT OF THE COMMITTEE ON THE EXHIBITION OF SPECIMENS.

YOUR committee respectfully report, that the well-conceived and thoroughly executed plan of arrangement adopted by your efficient local secretary, Mr. Samuel A. D. Sheppard, and his able assistants, rendered their labors much less onerous than they would have been without the aid of such competent and willing workers.

We found the goods on exhibition properly classified, tastefully displayed, and so placed as to be easy of access.

The marked feature of our Twenty-third Annual Exhibition was the large, varied, and valuable collection of drugs in their original packages.

The hall, notwithstanding its size, proving too small, both sides of the entry were occupied by bales and other bulky goods.

The hall had been very handsomely arranged for the display. Directly in front of the main entrance was a large banner with the words:

AMERICAN PHARMACEUTICAL ASSOCIATION, .

Twenty-third Annual Meeting,

Boston,

Sept. 7, 8, 9, 10, 1875.

The seal and motto of the city of Boston being in the centre.

On the left was the following quotation from "Romeo and Juliet:"

1575.

I do remember an apothecary,—

And hereabouts he dwells.

. . . In his needy shop a tortoise hung,

An alligator stuffed, and other skins

Of ill-shaped fishes; and about his shelves

A beggarly account of empty boxes,

Green earthen pots, bladders, and musty seeds,

Remnants of packthread, and old casks of roses,

Were thinly scattered to make up a show.

Noting this penury, to myself I said,— . . .

An' if a man did need a poison now,

Here lives a caitiff wretch would sell it him.







On the right was the following:

1875.

*Tempora mutantur et nos mutamur in illis.*

Say not the discoveries  
We make are our own.  
The germs of every art are  
Implanted within us,  
And God, our instructor,  
From hidden sources develops  
The faculty of invention.

On either side of the banner were framed portraits, life size, of Daniel B. Smith, president of the Association in 1852, and of C. Lewis Diehl, president in 1874.

Amongst the attractive features in the hall was a large collection of medicinal plants; many of them from the botanical gardens of Harvard College.

This collection numbered some two hundred distinct specimens, and many of them very rare, and worthy of the study of every pharmacist present. Among them we noticed a fine plant of the *Cinnamomum cassia*, of the *Aloe vulgaris*, the *Thea bohea*, the *Maranta arundinacea*, the *Croton tiglium*, the *Coffea Arabica*, and many others that were specially noteworthy.

We here append a short notice of the goods on exhibition, with the names of the exhibitors, our effort being more to direct attention to the several collections than to make any attempt at description.

*Messrs. Carter, Harris & Hawley*, of Boston, exhibit a handsome and very full line of drugs in original packages, essential oils, and druggists' sundries, in space 52 of hall, and a large assortment of sponges, and imported mineral waters, in spaces 88, 91, and 93 in entry.

*Messrs. Cheney, Myrick, Hobbs & Co.*, of Boston. A fine display of herbs, in bales and original packages. We direct especial attention to this collection; the goods not being selected for exhibition, but in bales as originally received. Space 87, entry.

*Messrs. Cutler Bros. & Co.*, of Boston, make a very large and creditable display of drugs in original packages, essential oils, sponges, and a full line of druggists' sundries, occupying space 45 of hall, and 88 and 92 of entry.

*Messrs. Gilman Bros.*, of Boston, exhibit a handsome line of essential oils, and drugs in powder, in space 25 of hall.

*Messrs. Kurlbaum & Co.*, of Philadelphia, make a fine display of camphor of their own refining, and of pure essential oils and chemicals, in space 50 of hall.

*Messrs. Lazell, Marsh & Gardiner*, of New York, display a fine line of drugs, pharmaceutical chemicals and preparations. We specially note their scale salts of iron, pepsin, pancreatin, and fluid and solid extracts; also the balances made by Baker & Son, the pattern of which is entirely new, and intended for the dispensing counter, and will turn with the one-fiftieth of a grain. With this collection, and under charge of Prof. P. W. Bedford, are some one hundred and fifty to two hundred cabinet specimens, all handsomely put up in glass-stoppered bottles, labelled with both the botanical and common names and habitat of each specimen, and are to be presented to the Massachusetts College of Pharmacy.

With same collection the New York College of Pharmacy display a labelled box to show their manner of displaying their cabinet specimens, the label giving the name and pharmaceutical history of contents. Space 55 of hall.

*Messrs. Lehn & Fink*, of New York. Specimens of drugs, chemicals, rare alkaloids, metals, etc.; a very fine display, including many rare drugs, Jaborandi, Boldo, salicylic acid of various qualities, etc. A case of opium alkaloids, and one containing sixty-four metals, attract attention. The greater part of this fine collection has been donated by this firm to the Massachusetts College of Pharmacy. Space 46 of hall.

*Messrs. McKesson & Robbins*, of New York, exhibit their gelatin-coated pills, and fluid extracts. With this collection we specially notice a fine specimen of Norwegian cod-liver oil; also a case containing one hundred and ten samples of

essential and fixed oils, an herbarium of the officinal plants of the German flora, some two thousand specimens in all, arranged by Prof. Gunther, of Jena. Also T. & H. Smith & Co.'s aloin, emplastr. canthar. liquid, and Tela vesicatoria.

*Mr. George C. Close*, of Brooklyn, shows, on same table, pure silica. Space 42 and 43 in hall.

*Mr. John S. Rodgers*, of Gloucester, Mass., displayed samples of isinglass of his own manufacture, in space 71 of hall.

*Messrs. W. H. Schieffelin & Co.*, of New York, display a large and handsome line of crude and powdered drugs, essential oils, and fine chemicals, a collection that merits special attention. Space 39 of hall.

*Mr. George A. Silvey*, of Martha's Vineyard, exhibits spermaceti as taken from the head of the sperm whale. Space 73 of hall.

*Messrs. Robert Shoemaker & Co.*, of Philadelphia, make a good display of powdered and ground drugs and spices, in space 48 of hall.

*Messrs. Weeks & Potter*, of Boston, display a fine line of drugs in original packages. We direct attention specially to a case of cardamoms, and of gum arabic, and gum tragacanth, all of fine appearance and quality. With this collection we found a handsomely mounted case containing some thousands of dollars' worth of ambergris,—a specialty with this firm, who claim to control the market of the world in this particular article. Space 44 in hall.

*Messrs. B. O. & G. C. Wilson*, of Boston, Mass., displayed a fine line of pressed herbs. The appearance of these herbs, their freedom from all contaminating substances, their perfect preservation of color, and other sensible properties, made manifest the great care and skill of this firm in putting their specialties upon the market, and fully maintained the high reputation that has been so generally accorded to them by the drug trade. They occupied space 49 in hall.

*Mr. Joseph L. Lemberger*, of Lebanon, Pa., displayed purified beeswax and true saffron, in space 50 of hall.

*Messrs. Melvin & Badger*, of Boston, exhibit camphor in powder. (Said to retain its pulverent condition.) Space 27 of hall.

CLASS 21.—PHARMACEUTICAL PREPARATIONS.

*Messrs. Arnold & McNary*, of New York, display Herring's London pharmaceutical preparations and drugs, essential oils, London perfumery, fancy goods, Maubert's Brussels soaps, etc., in space 57 of hall.

*Berlin Mineral Water Company*, of Boston, display aerated waters, in space 24 of hall.

*Messrs. W. W. Bartlett & Co.*, of Boston, exhibit pepsin and preparations of it of their own make, in space 60 of hall.

*Ira W. Blunt*, of Richmond, Va., exhibited Valentine's Meat Juice, a nutrient of recognized merit. This preparation is the natural juice of choice beef expressed under some hundred tons of pressure, and evaporated at a temperature not exceeding 130° F. It keeps well, is very pleasant to the taste, affording that concentrated nourishment so desirable in many diseases. One ounce is said to represent two pounds of beef. Space 22 of hall.

*Messrs. Bullock & Crenshaw*, of Philadelphia, display a fine line of their sugar-coated pills, in space 38 of hall.

*Messrs. Borrough Bros. Manufacturing Company*, display a large line of fluid extracts, made by their non-vacuum process, in space 14 of hall.

*Mr. George L. Floto*, of New York, exhibited cod-liver oil and an extract of meat, in space 16 of hall.

*Messrs. Grosvenor & Richards*, of Boston, exhibit belladonna and other plasters, in space 66 of hall.

*Messrs. Chester H. Graves & Sons*, of Boston, exhibit various grades of alcohol. This display is worthy of attention. The samples are exhibited in elegant flint glass bottles. The quality of the alcohol, especially the cologne spirit, was very superior. The tasteful display of the goods merits attention. Space 26 of hall.

*Messrs. Hance Bros. & White*, of Philadelphia, display a handsome line of their fluid and solid extracts, sugar-coated pills, fruit juices, and medicated lozenges. Space 30 of hall.

*Mr. Frederick Hoffmann*, of New York, exhibits Prof. Leube's Meat Solution, in space 41 of hall.

*Messrs. E. F. Houghton & Co.*, of Philadelphia, display cosmoline and its preparations, in space 84 of hall.

*Messrs. Keasby & Mattison*, of Philadelphia, display an extensive and handsome line of their granular effervescent preparations, gelatin-coated pills, etc., in space 62 of hall.

*Mr. Edward S. Kelly*, of Boston, exhibits fluid extracts and medicated waters, prepared by aid of animal charcoal, of fine appearance, of his own manufacture, in space 21 of hall.

*Messrs. Marvin Bros. & Bartlett*, of Portsmouth, N. H., exhibit cod-liver oil of their own make, of very fine quality, in space 78 of hall.

*Mr. Alvah Littlefield*, of Boston, exhibits his court plasters in space 68 of hall.

*Messrs. Mellor & Rittenhouse*, of Philadelphia, exhibit extract of liquorice and medicated lozenges of their manufacture, in space 47 of hall.

*Messrs. J. B. Patten & Co.*, of Boston, make a display of Robbins's plasters, in space 25 of hall.

*Messrs. Mercein & Gardner*, of New York, exhibit a full line of fluid extracts and chemicals, chemically pure and granulated chlorate of potash being one of their specialties. James R. Mercein has with the same collection some pharmaceutical preparations. Space 23 of hall.

*Nutrio Mills*, of Philadelphia, exhibit their dietetic preparations, in space 19 of hall.

*Mr. Jefferson Oxley*, of Nicholasville, Ky., can of crab orchard salts, in space 16 of hall.

*Messrs. S. V. & F. P. Scudder*, of New York, exhibit extract of liquorice in space 88 of entry.

*Messrs. Smith & Painter*, of Wilmington, Del., exhibit pure pineapple juice, in space 17 of hall.

*Messrs. Southall Bros. & Barcklay*, of Birmingham, England, make a fine display of pharmaceutical preparations and cod-liver oil. With this collection is a student's cabinet of specimens, placed at the disposal of Prof. P. W. Bedford. Space 55 of hall.

*Mr. James G. Steele*, of San Francisco, Cal., exhibits the *Grindelia robusta* and its preparations. This is a newly recognized medicinal plant, of reputed merit in curing the effects of poison oak and asthma. Space 77 of hall.

*Mr. Thomas Stone*, of Swampscott, Mass., exhibits cod-liver oil, in space 27 of hall.

*Mr. Henry Thayer*, of Cambridgeport, Mass., displays a full line of their fluid extracts, sugar-coated pills, and resinoids. Also their solid extracts in powder of true officinal strength. Space 15 of hall.

*Messrs. W. R. Warner & Co.*, of Philadelphia, display a fine line of their sugar-coated pills, in space 37 of hall.

*Messrs. John Wyeth & Bro.*, of Philadelphia, exhibit a full line of their compressed pills, made by dry compression of the powders without the addition of any excipient. They also exhibit Peter Squier's, of London, solid extracts and juices, Bishop's granular effervescent salts, Marvin's cod-liver oil, emulsion of cod-liver oil and phosphate of lime, and emulsion of cod-liver oil and lactophosphate of lime, Smith & Painter's pure pineapple juice, salicylic charpie, boracic lint, etc. Space 17 of hall.

*Mr. James H. Taylor*, of Newport, R. I., exhibits *sapo mollis* made from cotton-seed oil. Space 51 of hall.

#### CLASS 3.—CHEMICALS.

*Prof. James F. Babcock*, of Boston, exhibited samples of fused sulphide of iron, iodide of arsenic, refined neats' foot oil, etc. Space 22 of hall.

*Mr. Leopold Babo*, of Boston, displayed a large line of very rare chemicals and drugs, numbering nearly one hundred samples. Space 18 of hall.

*Messrs. George H. Bush & Co.*, of Boston, exhibit several grades of glycerin, also samples of their mineral paint. Space 29 of hall.

*Prof. George F. H. Markoe*, of Boston, exhibited phosphoric acid, solution of chloride of iron. Space 27 of hall.

*Messrs. Marx & Rawolle*, of New York, exhibit several grades of glycerin. Space 27 of hall.

*Pennsylvania Salt Manufacturing Company*, of Philadelphia, displayed specimens of cryolite and its preparations, alum in large and fine crystals, and monocarbonate of soda in handsome crystals. Space 93½ of entry.

*Powers & Weightman*, of Philadelphia, extensive display of fine chemicals, morphia, quinia, cinchonia, cinchonidia, quiniidia, and strychnia salts, scale salts in great variety, fine crystals of citric and tartaric acids, gallic acid, iodide and bromide of potassium, essential oils, etc.

This was one of the finest displays in the exhibition. Among the articles exhibited we notice some 600 ounces of sulphate of quinia; some 200 ounces of sulphate of morphia; a vase of nitrate of silver containing about 100 ounces in large and beautiful crystals, also some fine crystals of alum and sulphate of copper, and a miniature collection of photographic chemicals. This firm deserve especial mention for the magnificent display made by them, the arrangement of the chemicals being very fine, involving a large expense, willingly incurred, their exhibit of goods requiring a table 33 by 6 feet. Space 53 of hall.

*Merrimac Chemical Company*, of Boston, exhibit specimens of acids, salt cake, nitre cake, etc. Space 28 of hall.

*Messrs. Rosengarten & Sons*, of Philadelphia, exhibit a full line of their pure chemicals, among which we note quinia and its salts, morphia and its salts, a number of hypophos-

phites and sulphocarbolates, also some fine samples of East India grown cinchona barks. Space 32 of hall.

*Messrs. Charles T. White & Co.*, of New York, made a fine display of quinia, morphia, and strychnia salts, and of iodide and bromide of potassium. Space 35 of hall.

CLASS 4.—PERFUMERY AND DRUGGISTS' SUNDRIES.

*Messrs. Joseph Burnett & Co.*, of Boston, exhibit perfumery. This firm exhibit a cologne fountain in the centre of the hall. The fountain is imbedded in a bank of flowers, and is a most attractive object. We notice also a case of vanilla pods as imported, also a living vanilla plant with specimens showing the pods in clusters as gathered. We believe this is the first time that the vanilla plant has been exhibited in this latitude, the specimen being obtained from Mexico especially for this exhibition.

*Messrs. Barnard & Co.*, of Boston, exhibit some fine perfumery, etc., in space 20 of hall.

*Messrs. Joseph T. Brown & Co.*, of Boston, make a handsome display of perfumery, in space 81 of hall.

*Messrs. M. S. Burr & Co.*, of Boston, exhibit nursing-bottles, in space 24 of hall.

*Mr. Julius Fehr*, of Hoboken, N. J., exhibits a toilet powder, in space 65 of hall.

*Messrs. F. M. Keeler & Co.*, of Boston, exhibit shaving-mugs, in space 82 of hall.

*Messrs. J. B. Kelly & Co.*, of Boston, display a line of druggists' sundries, in space 65 of hall.

*Messrs. McKeone, Van Haagen & Co.*, of Philadelphia, display soaps, in space 80 of hall.

*Messrs. Pinckney, Jackson & Co.*, of New York, exhibit some choice specimens of fine spices. Space 20 of hall.

*Mr. Theodore Ricksecker*, of New York, displays a full line of fancy goods, including perfection nursing-bottles and perfection tooth-brushes, in space 56 of hall.



*Messrs. Robinson Bros. & Co.*, of Boston, display soaps, in space 83 of hall.

*Messrs. Shaw, Livermore & Co.*, of Boston, exhibit shaving-mugs, in space 61 of hall.

*Messrs. Lockwood, Brooks & Co.*, of Boston, display inks and mucilage. Space 85½ of entry.

*Messrs. Thompson, Langdon & Co.*, of New York, exhibit Crown perfumes, brushes and combs. Space 59 of hall.

*Messrs. Young, Ladd & Coffin*, of New York, exhibit perfumery. A rich and elegant display, of interest to the apothecary. These goods are exhibited in a fine plate-glass case surmounted by a stand supported on pillars tastefully decorated. Their preparations are of very superior quality.

*American Sanitary Association*, of Boston, exhibit carbolic purifying powder. Space 25 of hall.

*Messrs. Carter, Dinsmore & Co.*, of Boston, exhibit ink and mucilage. Space 92½ of entry.

*J. W. Tufts & Co.*, of Boston, exhibit perforated frictional belts, stated to be of value as an abdominal supporter and preventive of rheumatism. Space 105 of hall.

*Messrs. Arnold & McNary*, of New York, display a fine assortment of fancy goods, fine brushes, etc. Spaces 40, 41, and 57 of hall.

#### CLASS 5.—APPARATUS AND SHOP FURNITURE.

*American Rubber Company*, of Boston, exhibit a variety of rubber goods. Pure rubber and gutta percha domestic syringes, breast-pumps, rubber corks; and a general assortment of hard rubber goods in space 79 of hall.

*Messrs. J. T. Brown & Co.*, of Boston, make a good display of beakers, balances, and of thermometers. Space 81 of hall.

*Ira W. Blunt*, of Richmond, Va., exhibited Valentine's Automatic Bottle and Vial Corker, a most ingenious machine for corking bottles and vials. It is claimed that this machine, worked by a man and a boy, will securely cork from 30 to 50

bottles per minute. The cork enters the bottle by a rotatory, handlike motion, and does its work thoroughly without undue breakage. In same collection was shown a bottle with internal screw-neck, intended for holding aerated liquids. It is stated that bottles of this construction, strongly made for the purpose of testing the invention, have, upon trial, proved that whilst bottles corked and wired in the usual manner of putting up soda-water, lost their contents under a pressure of 50 pounds, that the screw-necked bottles held their contents perfectly under a pressure of 160 pounds. Space 1 of hall.

*Messrs. Bray & Co.*, of Boston, exhibit seamless metallic boxes, in space 66 of hall.

*Messrs. Brewster & Rice*, of Pittsfield, Mass., exhibit Brown's patent box for seidnitz powders. Space 50 of hall.

*Mr. H. H. Burrington*, of Providence, R. I., exhibits a uterine supporter in space 76 of hall.

*Messrs. H. B. & O. W. O. Chamberlain*, of Boston, exhibit a good assortment of chemical apparatus, prescription balances, and Bohemian glassware, in space 51 of hall.

*Messrs. Codman & Shurtleff*, of Boston, make a good display of surgical instruments, in space 11 of hall.

*Mr. F. A. Davidson*, of Boston, exhibits an ingeniously constructed home-made still, in space 73 of hall.

*Davidson Rubber Company*, of Charlestown, Mass., exhibit a good line of rubber goods, in space 67 of hall.

*Messrs. Dennison & Co.*, of Boston, exhibit druggists' boxes and tags, in space 72 of hall.

*Mr. W. G. Dinwiddee*, Louisville, Ky., exhibits graduated evaporating-dishes, in space 66 of hall.

*Messrs. G. D. Dows & Co.*, of Boston, exhibit soda-water apparatus, "The Eureka" and "The Temple of Ceres," both beautiful designs. They also exhibit a generator, tumbler-washer, and bottling machine, in space 3 of hall.

*Mr. M. L. Edwards*, Salem, Ohio, exhibits tincture presses, in space 64 of hall.

*Enterprise Manufacturing Company*, of Philadelphia, exhibit drug mill, herb cutter, and cork presses, in space 63 of hall.

*Mr. James Folsem*, of Boston, exhibits medicine-chests, in space 60 of hall.

*Mr. E. S. Kelley*, of Boston, exhibits a copper still and percolator, in space 21 of hall.

*Messrs. Alfred C. Garratt & Co.*, of Boston, exhibit electric disks. These appear to be well contrived to attain the end in view, and are worthy of attention. Space 74 of hall.

*Messrs. Wm. Gee & Co.*, of New York, make a good display of soda-water apparatus. We note as worthy of attention their manner of drawing soda-water, with any desired quantity of syrup, at one motion of hand. Space 2 of hall.

*Mr. R. R. Kent*, of East Boston, exhibits nipple-shields, in space 16 of hall.

*Mr. A. M. Knowlson*, of Troy, N. Y., exhibits a suppository-mould of ingenious construction. The suppository being moulded by pressure, and without heat. The product being of equal weight, uniform shape, and fine finish. Space 24 in hall.

*Mr. John Matthews*, of New York, exhibits a steel generator and fountain, and an acid dispenser. This generator and fountain seem to possess the qualities claimed for them, great strength, without undue weight. The acid dispenser works well. Space 1 of hall.

*Messrs. Andrew J. Morse & Son*, of Boston, exhibit some excellent soda-water apparatus, copper fountain and generator, in space 6 of hall.

*Mt. Washington Box Company*, of Boston, exhibit impervious wood boxes. These boxes seem to supply a want long felt in our trade. Space 62 of hall.

*P. J. McElroy*, of East Cambridge, exhibits a line of well-made glass syringes, in space 69 of hall.

*New England Glass Company*, of Boston, make a most

handsome display of druggists' glassware in all its varieties. We noticed specially a new show-jar, combining show-jar and color-bottle, tinctures and salt-mouths, stoppered in best manner, richly decorated tooth-powder boxes, and cologne-bottles. The superior finish and artistic display of this collection made it one of the points of attraction in the hall. Space 7 of hall.

*Dr. W. H. Pile*, of Philadelphia, exhibited some of his carefully made hydrometers and specific-gravity-bottles, in space 75 of hall.

*Mr. J. H. Plaisted*, of Waterville, Me., exhibited suppository-moulds, in space 62 of hall.

*Messrs Porter Bros. & Co.*, exhibit chest-protectors, in space 16 of hall.

*Mr. A. D. Puffer*, of Boston, exhibits soda-water apparatus, copper generators, and iron fountains of careful manufacture, in space 5 of hall.

*Messrs. Camille, Reid & Co.*, of Boston, exhibit druggists' boxes, in space 58 of hall.

*Mr. Charles Stodder*, of Boston, exhibits a compound microscope, in space 51 of hall.

*Messrs. Scripture & Parker*, of Boston, exhibit soda-water fountains, in space 96 of hall.

*Messrs. Thompson & Marsh*, of Boston, exhibit nursing apparatus, in space 65 of hall.

*Mr. Henry Troemner*, of Philadelphia, exhibits ten patterns of scales, embracing prescription, counter, and analytical, all of superior finish and accuracy. Space 10 of hall.

*Messrs. Thayer, Babsen & Co.*, of Boston, make a good display of glassware, in space 8 of hall.

*Mr. James W. Tufts*, of Boston, exhibits some handsome soda-water apparatus, "The Advance" and "The Cathedral," in space 4 of hall.

*Messrs. James W. Tufts & Co.*, of Boston. Rochelle boxes in a unique and novel design. Space 24 of hall.

*Messrs. Whitall, Tatum & Co.*, of Philadelphia, exhibit a good assortment of druggists' glassware, packing-bottles, acid carboys, lettered bottles, poison-bottles, syrups, and prescription vials in all their varieties; one of the best displays in the exhibition, in space 9 of hall.

*Messrs. W. H. Schieffelin & Co.*, of New York, exhibit three Swift's drug-mills, in space 87½ of entry.

*Messrs. Dean, Foster & Co.*, of Boston, exhibit druggists' glassware, in space 62 of hall.

*Burroughs Bros. Manufacturing Company*, of Baltimore, exhibit a model of circulating hot water still used in the preparation of fluid extracts.

They claim that by using hot water as a heating medium a sufficiently uniform and low temperature (112° to 120° F.) is preserved to preclude injury to the sensitive active principles of the extract, and not using a vacuum, none of the volatile principles are lost in the recovery, of superfluous alcohol. Space 14 of hall.

*Benton, Myers & Canfield*, of Cleveland, Ohio, exhibit Spencer's suppository-mould. A meritorious article, of reasonable price. Space 62 of hall.

*Joseph L. Lemberger*, of Lebanon, Pa., exhibit graduated plaster-spreading machine. Space 50 of hall.

*Prof. George F. H. Markoe*, of Boston, exhibits compound microscopic objective, microscopic objects and accessories. Space 27 of hall.

*S. E. G. Rawson*, of Saratoga, N. Y., exhibits suspensory bandages. Space 76 of hall.

*Isaac A. Singer*, of New York, exhibits graduated chest and lung protector. Space 50 of hall.

*Thomas J. Walton*, of Salem, Ohio, exhibits sample-book and samples of labels. Space 85 of hall.

*Hance Bros. & White*, of Philadelphia, exhibit drug-mills and percolators. Space 30 of hall.

## CLASS 6.—SCIENTIFIC COLLECTIONS.

*Prof. James F. Babcock*, of Boston, exhibits a valuable collection of scientific journals, chemical and pharmaceutical books, in spaces 85 and 90 of entry.

*Mr. F. A. Davidson*, of Boston, exhibits a collection of labels, in space 85 of hall.

*Mr. Charles A. Heinitsh*, of Lancaster, Pa., exhibits specimens of nickel ores, in space 28 of hall.

*Mr. Robert R. Kent*, of Boston, makes a rare display of old relics, drawing the line markedly between then and now. Among them we found an old copper sign, one hundred years old, of a man and mortar; invoice-book of Dr. Eliot, 1783; old Russian isinglass, soap, old books, quaint old syrup-jars, etc., in space 16 of hall and 94 of entry.

*Massachusetts College of Pharmacy* exhibits an old mortar and syrup-jars, in space 85 of hall.

*Messrs. Theodore Metcalf & Co.*, of Boston, exhibit a portrait of Thomas Morson, in space 85 of hall.

*Mr. Allan Pollock*, of New York, exhibits a botanical index to the medicinal plants, in space 85 of hall.

*Messrs. Wallace Bros.*, of Statesville, N. C., exhibit dried specimens of *Materia Medica*.

*Messrs. Brewster & Knowlton*, of Boston, exhibit a mineralogical and geological chart, in space 90½ of entry.

*Mr. Charles E. Hobbs*, of Boston, exhibits Hobbs's "Botanical Handbook of Common Local English Botanical and Pharmacopœial Names of the Crude Vegetable Drugs in Common Use." This book deserves a more extended notice than our space will allow us to give. It is of great value to the apothecary, and especially to the young student, the list of common local names which occupies the first part of the book being nearly 8000 in number. The work indicates the vast field for improvement in the naming of plants in common use by giving one common English name instead of many (twelve for *Eupatorium perfoliatum*).

*Mr. A. C. Peters*, of Newark, N. J., exhibits ancient books on pharmacy, in space 85 of hall.

*Mr. Benjamin Lillard*, of Nashville, Tenn., exhibits *Pharmaceutical Gazette*, in space 65 of hall.

*Prof. John M. Maisch*, of Philadelphia, exhibits *American Journal of Pharmacy*, and the Eleventh Annual Report of the Alumni Association of the Philadelphia College of Pharmacy, in space 65 of hall.

Your committee suggest that the accompanying plan on arrangement of the hall be published with our report, our Boston friends kindly proffering the requisite electrotype.

In closing our report, we will but add that the thanks of the Association are justly due to the exhibitors for the good taste they have shown in the display of their goods, and for the trouble and expense they have so willingly incurred in their efforts to give tangible proof that the march of pharmacy is onwards, and to add to the attractions of the twenty-third annual meeting of our Association. All of which is respectfully submitted.

JOSEPH ROBERTS,  
ERASTUS H. DOOLITTLE,  
A. S. LEE,  
POWHATAN E. DUPUY,  
GEORGE LEIS.

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## REPORT OF THE COMMITTEE ON LEGISLATION.\*

At the last meeting of the Association, a memorandum written by our fellow-member A. F. G. Streit was referred to this committee. The paper refers to the possibility that the various pharmacy laws enacted by different States might be declared unconstitutional by the U. S. Supreme Court. No

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\* Read at the third session.

reasons have been given for this supposition, but the suggestion made that the committee examine this point closely. It is obviously out of the power of this committee to obtain a decision of the highest tribunal of the country without presenting a case, and we were, therefore, able only to repeat the same course that had been repeatedly adopted since the year 1868, namely to obtain the opinion of attorneys at law, which again, as in every former instance, was in favor of these enactments. In addition to what was stated on this subject in last year's report, we may be permitted to add, that, as far as your committee is advised, the supposed illegality of the pharmacy laws did not enter into the arguments of the opponents of these measures when discussed before the legislatures; that their legality has not been questioned during the prosecutions that have arisen under these acts, and that all decisions by magistrates and the lower courts have been in favor of these laws. It appears to us, therefore, as if the American Pharmaceutical Association has reasons enough to believe in the constitutionality of the pharmacy laws, and that they would be sustained even in the highest courts of our country.

The pharmacy acts previously passed are generally carried out in a proper spirit. The wisdom of these laws is plainly proven by the fact, that the number of rejections at the examinations of the Boards of Pharmacy is very considerable, frequently reaching more than 25 per cent. of the total number examined during the year. Several prosecutions occurred in Philadelphia, judgment being given against those who had not complied with the law.

The legislatures of several States, which were in session since our last annual meeting, had pharmacy laws under consideration, all of which, however, failed to pass except in the State of New Hampshire, where from six candidates nominated by the New Hampshire Pharmaceutical Association, the Governor appointed the following Commission of Pharmacy and Practical Chemistry: Elias S. Russell, of Nashua; Charles S. Eastman, of Concord, and Charles A. Tufts, of Dover, who retire after one, two, and three years. Annually hereafter the Governor appoints one in place of the retiring



commissioner. Under this law every pharmacist who at the time of its passage, had been in business for six months or more, is entitled to registration; all others have to pass a satisfactory examination. A copy of the law is appended to the report.

The regulation of the practice of pharmacy progresses more rapidly in the Dominion of Canada. Recently in the province of Ontario an act was before the legislature amending the pharmacy act of 1871, but had to be withdrawn, on account of the opposition of members of the medical profession; the act will, however, be again presented at the next session.

In the province of Quebec an amendment to the act of 1870, by which the Pharmaceutical Association of the province of Quebec was incorporated, has become a law; it requires the registration and examination of proprietors, assistants, and apprentices, under the auspices of the Pharmaceutical Association of Quebec. This act has been the direct cause of the organization of a pharmaceutical school, the first one, we believe, established in the British possessions in America. The faculty of this new college embraces the chairs of chemistry, botany and materia medica, and toxicology, the incumbents of which are J. Baker Edwards, Ph. D., J. B. McConnell, M. D., and A. H. Kollmeyer, M. D.

The stamp-tax on medicines under the internal revenue laws of the United States, which has given so much trouble to the pharmacists and druggists, appears to be satisfactorily settled now by Section 22 of the so-called "Little Tariff Bill," which received the President's signature on the eighth day of last February: this section provides,

"That hereafter nothing contained in the internal revenue laws shall be construed so as to authorize the imposition of any stamp-tax upon any medicinal articles prepared by any manufacturing chemist, pharmacist, or druggist, in accordance with a formula published in any standard Dispensatory or Pharmacopœia in common use by physicians and apothecaries, or in any pharmaceutical journal issued by any incorporated college of pharmacy, when such formula and where found shall be distinctly referred to on the printed label

attached to such article, and no proprietary interest therein is claimed. Neither shall any stamp be required when the formula of any medicinal preparation shall be printed on the label attached to such article where no proprietorship in such preparation shall be claimed."

It will be remembered that the internal revenue office has, during the last few years, adhered to a ruling according to which all medicinal preparations, including the officinal ones, are liable to the stamp-tax, if they are kept on hand ready for sale, and have a label containing, besides the name of the article, also directions for their use or enumerating the ailments against which they may be employed. This decision remains in force, the section quoted above stating the conditions upon which the tax is remitted. These conditions are:

1. That no proprietary interest must be claimed in these preparations.

2. That they must be prepared according to a formula published in one of the works indicated, and,

3. That the formula be distinctly and unmistakably referred to, or printed in full upon the label, the intention evidently being, that the formula and mode of preparation shall be accessible to all.

These requirements, although they are a departure from the custom hitherto followed, entail no hardship upon the pharmacist and druggist, and enable him to keep on hand, ready for delivery, any legitimate medicine without the necessity of being ranked with the manufacturer of patent medicines.

Respectfully submitted,

JOHN M. MAISCH,  
Chairman of Committee.

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PHARMACY LAW OF THE STATE OF NEW HAMPSHIRE.

IN THE YEAR OF OUR LORD ONE THOUSAND EIGHT HUNDRED  
AND SEVENTY-FIVE.

*AN ACT to prevent incompetent persons from conducting the business of Druggists  
and Apothecaries in this State.*

*Be it enacted by the Senate and House of Representatives in General Court  
convened :*

SECTION 1. That hereafter no person shall conduct or keep a shop of any kind in this State for the purpose of retailing drugs, medicines, or such chemicals as are used in compounding medicines, or engage in the business of compounding and putting up prescriptions of physicians, and vending medicines, either as proprietor, agent, or assistant, without having first obtained a certificate of qualification and competency for such business from the commissioners to be appointed under the provisions of this act; provided it shall be lawful for any person to sell proprietary medicines.

SEC. 2. The governor, with advice of the council, shall forthwith appoint three persons competent to perform the duties herein imposed upon them, who shall be styled "The Commission of Pharmacy and Practical Chemistry," one of whom shall hold his office one year, one two years, and the third three years, and each until his successor is appointed and qualified; and at or before the expiration of the term of office of each person so appointed, the governor in like manner shall appoint a like person to said office, who shall hold his office for three years, or until his successor is appointed and qualified. In case a vacancy in said commission shall occur at any time from any cause, the governor, with advice of the council, shall appoint a competent person to fill said vacancy for the unexpired part of the term of office of the person causing such vacancy. Before entering upon the duties of his office each commissioner shall be sworn to faithfully and impartially discharge the duties of his office, and a record thereof shall be made on his commission. It shall be the duty of the commissioners appointed, as aforesaid, to examine all persons who shall desire to engage in the business of apothecaries and druggists, and if found skilled and learned in pharmacy they shall give such persons certificates, signed by at least two of said commissioners, and shall state therein that the person to whom the same is issued is a skilled pharmacist, and authorized to engage in the business of an apothecary and druggist.

SEC. 3. The said commissioners shall procure and keep a suitable book at the office of the Secretary of State, at Concord, New Hampshire, wherein they shall register the names and places of residence of all persons to whom they shall issue said certificates after an examination, and the date thereof, names and places of residence of all persons engaged in conducting the business of apothecaries for themselves and others, in this State, six months previous to the passage of this act, upon application therefor, and it shall be the duty of all such persons, engaged as aforesaid, to furnish the commissioners of registration satisfactory evidence that they are engaged in such

business, within sixty days, after they shall have been notified by a circular letter from the commissioners, of the time and place of registration, and said commissioners shall hold at least three sessions, within said sixty days, for registration of such as have engaged in the business as aforesaid. In case of failure or neglect to be registered by any person or persons so engaged in said business within the said sixty days, such person or persons shall thereafter procure a certificate by examination. Said book, wherein the registration is made as aforesaid, shall be at all reasonable times open to the examination of all persons.

SEC. 4. Said commissioners shall be entitled to demand and receive from every applicant for examination, to whom a certificate shall be granted, as aforesaid, the sum of five dollars, and for the notice and registration of each person now engaged in the business of an apothecary the sum of two dollars, and the money so received shall be in full payment for the services and expenses of said commissioners.

SEC. 5. All pharmacists that shall hereafter be registered, according to the provisions of this act, are hereby authorized to keep spirituous liquors for compounding their medicines.

SEC. 6. If any person shall engage in the business of retailing and vending, directly or indirectly, drugs, medicines and chemicals, and in dispensing medicines, and compounding physicians' prescriptions, contrary to the provisions of this act, every such person shall be liable to a fine not exceeding fifty dollars for each and every week such person shall continue in said business without being registered, as provided by this act, which fine may be recovered by an action of debt for the use of any person who shall sue therefor, or by an indictment.

SEC. 7. The provisions of this act shall not be so construed as to apply to physicians compounding and putting up their own prescriptions.

SEC. 8. This act shall take effect from and after its passage.

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## PHARMACY LAW OF THE PROVINCE OF QUEBEC, CANADA.

*AN ACT to amend the Act of incorporation of the Pharmaceutical Association of the Province of Quebec, and to Regulate the Sale of Poisons.—[Assented to 28d February, 1875.]*

WHEREAS it is expedient for the safety of the public that all persons engaged in the sale of drugs and poisons, and the dispensing of medicines, should possess a competent, practical knowledge of chemistry, and other branches of useful knowledge; and whereas certain persons desirous of advancing chemistry and pharmacy, and of promoting a uniform system of educating those who should practice the same, formed themselves into a society called the "Pharmaceutical Association of the Province of Quebec," which said society was, in the year of our Lord one thousand eight hundred and seventy, incorporated by Her Majesty, by and with the advice of the legislature of Quebec; and whereas for the purposes of extending the benefits which have already resulted from the said act of incorporation, it is desirable

that additional powers be granted for regulating the qualifications of persons who may carry on the business of pharmaceutical chemists, or chemists and druggists, and for the regulation of the sale of poisons, and for other purposes connected with pharmacy; therefore Her Majesty, by and with the advice and consent of the legislature of Quebec, enacts as follows:

1. The said act of incorporation granted to the said association, and known as "The Pharmaceutical Association Act of 1870," save and except such part or parts thereof as are hereby altered, varied, or repealed, shall be, and the same are hereby confirmed and declared to be, in full force and virtue, and shall be as good and effectual, to all intents and purposes, as if this act had not been passed.

2. The council of the said pharmaceutical association shall be, and the same are hereby authorized and empowered to alter and amend the by-laws of the said association made and established under or in pursuance of the said act of incorporation, and to make or establish such new or additional by-laws as they shall deem proper or necessary for the purposes contemplated by the said act of incorporation or by this act.

3. All persons in business on their own account as dispensing chemists or apothecaries prior to the passing of this act, shall be entitled to be placed upon the register and to be certified as licentiates in pharmacy.

4. All clerks who have been not less than five years in the trade shall, after satisfactory examination before the board of examiners of the association, be entitled to be placed on the register as "certified clerks."

5. All clerks and apprentices who have not been five years in the trade, shall go through the required curriculum of study and pass the examinations before they can be registered as "certified clerks."

6. Every youth, before he is taken as apprentice by a licentiate of pharmacy, shall produce satisfactory evidence of a good moral character, and pass a preliminary examination in the English, French, and Latin languages, and arithmetic, after which he shall be registered as a "certified apprentice."

7. In addition to the preliminary examination for apprentices, there shall be two other examinations. The first, to be called the "minor examination," shall be passed by all certified apprentices before they can take the position and become qualified as "certified clerks."

The candidate shall be examined in the translation and dispensing of prescriptions, pharmacy, chemistry, especially the chemistry of poisons, posology, and materia medica.

After passing this examination the candidate shall be registered as a "certified clerk."

8. The second examination shall be called the "major examination," and shall embrace the same subjects as the "minor examination," but a knowledge of botany, and a more extended knowledge of materia medica and pharmaceutical chemistry will be required. The candidate must also produce evidence that he has served at least four years in a drug store, and has attended two courses of lectures on chemistry, two courses on materia medica, and one course on botany.

After passing this examination, and producing the required certificates, the candidate shall be registered as a "licentiate of pharmacy."

9. All the examinations referred to in the previous clauses, viz., the preliminary examination, the minor examination, and the major examination, shall take place and be regulated by such rules and regulations as may be in force at the time such examinations are held, and all candidates for any of the said examinations shall pay such fees as may be imposed by any such rules or by-laws.

10. The council of the said corporation for the time being, by themselves, or such other competent persons as they shall think fit to appoint, shall examine and decide upon the admission of licentiates, certified clerks, and certified apprentices of the said corporation, and grant such certificates or diplomas as they shall think proper to the persons whom they shall deem qualified to be such licentiates, certified clerks, or certified apprentices respectively.

11. The board of examiners for the time being shall dispense with the examinations herein provided for, and shall accept, in lieu thereof, authenticated certificates of examination by duly appointed medical or pharmaceutical boards, accompanied by certificates of good moral character, and subject to such other regulations as may be imposed by by-law.

12. The registrar shall from time to time make out and maintain registers of: 1st, licentiates in pharmacy; 2d, certified clerks; and 3d, certified apprentices respectively; and shall grant, on application, certificates of such registration on payment of such fee as may be fixed by by-law; and the said registrar shall make new registers for each year, and omit therefrom the names of persons deceased or transferred from one register to another.

13. Members of the association shall pay the following fees, namely: Every licentiate of pharmacy shall every year pay to the association a fee or subscription not exceeding ten dollars per annum; every certified clerk shall pay to the association an annual fee not exceeding five dollars; and every certified apprentice shall pay an annual fee not exceeding two dollars. Such fees shall be due on the first day of May in every year, and any licentiate, clerk, or apprentice, not paying such fee before the first day of July in every year, shall be removed from the register, and lose the privileges conferred on him by this act; but he shall be restored to all his former privileges by the council of the association on payment of a fine not exceeding five dollars, if paid before the first of the following October.

14. The annual general meeting of the association shall be held alternately in the cities of Montreal and Quebec, on the second Tuesday in the month of June in each year, or such other day near thereto as shall be determined by the council.

15. On and after the first day of May, 1875, it shall be unlawful for any person to keep open any store for the retailing, dispensing, or compounding of the poisons enumerated in schedule A, or to sell or dispense the said enumerated poisons, or to engage in the dispensing of prescriptions, or to assume or use the title chemist and druggist, or chemist or druggist, apothecary or pharmacist, or pharmacist or dispensing chemist, within this province, unless he be registered in accordance with the provisions of this act as licentiate in pharmacy, or be a registered member or licentiate physician of the college of physicians and surgeons of the province of Quebec; and it shall be unlawful for any such druggist, chemist, pharmacist, or pharmacist, to

employ any clerk or apprentice in any shop or store for the sale of such poisons, or in the dispensing of medicines, except such clerk or apprentice be registered as required by this act.

16. Any person offending against the provisions of the preceding section, shall incur a penalty for every such offence not exceeding fifty dollars, to be recovered before any magistrate, together with costs.

17. If any person shall falsely represent by any name, title, or description, that he is registered under this act, or falsely represent the class or grade of his registration, or engage himself as a certified clerk, not being registered as such, or as a certified apprentice, not being registered as such, he shall, upon conviction before a magistrate, be liable to a fine for every such offence not exceeding twenty-five dollars, together with costs.

18. It shall be unlawful to keep or sell any of the poisons named in schedule A, unless the box, bottle, vessel, wrapper, or cover, in which such poison is contained, be distinctly labelled on black label with the name of the article and the word "poison," and with the name and address of the seller of the poison. And it shall be unlawful to sell any such poison to any person unknown to the seller, unless introduced by some person known to the seller; and on every sale of such article the seller shall, before delivery, make or cause to be made an entry in a book to be kept for that purpose, stating in the form set forth in schedule B to this act, the date of the sale, the name and address of the purchaser, the name and quantity of the article sold, and the purpose for which it is stated by the purchaser to be required, to which entry the signature of the purchaser, and of the person, if any, who introduced him, shall be affixed; and any person selling such poison otherwise than is herein provided, shall, upon conviction before a magistrate, be liable to a penalty not exceeding twenty-five dollars; and for the purpose of this section the proprietor, on whose behalf any sale is made by any apprentice or servant, shall be deemed to be the seller.

19. Persons offending against sections 13, 15, 16, 17, or 18 of the present act may be proceeded against either by the pharmaceutical association of the province of Quebec, or any person of the said province.

20. The several articles named or described in schedule A, shall be poisons within the meaning of this act, and the council of the said corporation may, from time to time, by by-law, and with the concurrence and approval of the board of governors of the college of physicians and surgeons, declare that any article named in such by-law be deemed a poison within the meaning of this act, and it shall then be added to and become part of schedule A, and such addition shall be advertised in the *Quebec Official Gazette*.

21. All penalties imposed by this act shall be recoverable with costs on the oath of any one credible witness before any recorder or justice of the peace, for the district in which the offence is committed, and said penalty and costs in default of immediate payment shall be enforced by distress; and in default of sufficient distress, the defendant shall be liable to be imprisoned in the common gaol of the district, for a period not exceeding ninety days, unless such penalty and costs be sooner paid; and no person competent to be a witness in any suit or prosecution in which the corporation may be engaged, shall be deemed incompetent by reason of his being a member or officer of the said corporation.



22. All penalties imposed under this act shall belong to and be payable to the said corporation, and shall be applied for the general purposes of this act.
23. The act passed in the session of parliament of the heretofore province of Canada, held in the 27th and 28th years of Her Majesty's reign, chapter 51, is hereby repealed, and section 16 of chapter 71 of the consolidated statutes for Lower Canada thereby repealed, shall not revive, but shall be considered as repealed, notwithstanding the repeal of the said act.
24. Nothing in this act shall interfere with the privileges conferred upon physicians and surgeons by the various acts relating to the practice of medicine and surgery in this province, nor with the business of wholesale dealers in drugs in the ordinary course of wholesale dealing, nor with chemical manufacturers, nor with duly licensed veterinary surgeons.
25. This act may be cited as "The Quebec Pharmacy Act of 1875."

SCHEDULE A.

Arsenic and its preparations.  
Prussic acid.  
Emetic tartar.  
Cyanide of potassium and all metallic cyanides.  
Aconite and its preparations.  
Opium and its preparations, except paregoric and syrup of poppies.  
Essential oil of almonds, unless deprived of prussic acid.  
Corrosive sublimate.  
Cantharides.  
Savin and its oil.  
Ergot of rye and its preparations.  
Strychnine, and all poisonous vegetable alkaloids and their salts.

SCHEDULE B.

DATE.	Name of purchaser.	Address of purchaser.	Name and quantity of poison sold.	Purpose for which poison is required.	Signature of purchaser.	Signature of person introducing purchaser.



## PHARMACEUTICAL LEGISLATION IN NEW JERSEY.\*

BY JAMES R. MERCEIN.

UNDER the above caption I propose giving a brief sketch of the persistent efforts made by New Jersey pharmacists during the past decade, to lift themselves out of the beaten track of ignorant conservatism, and by a wise advocacy of practical laws prove themselves true lovers of intelligent progress. These endeavors to show that

"Men may rise on stepping-stones  
Of their dead selves to higher things,"

have, up to the present time, proved abortive. *Why* they have failed is what I wish to speak of, so far as my own impressions go, hoping that a frank and outspoken expression of opinion will elicit from representatives of States more fortunate than my own, the *modus operandi* of successful effort; and from delegates of sections not so lucky, a sympathetic comparison of past failures, so that by a correlation of ideas some more feasible method may be discovered whereby to achieve success. If an undeviating, untiring "sticking to it" for year after year, had availed, we of New Jersey would now be revelling in the satisfaction of a well-earned victory, but as yet, 'tis a waiting race, and we jog on toward the goal, handicapped with a weight of old-fogyism, stupidity, and mercenary obstinacy, truly wonderful for its depth, breadth, and general thickness! And now for some facts:

As early as the year 1830, a bill was passed by the legislature, entitled "An act to incorporate medical societies for the purpose of regulating the practice of physick and surgery;" one section of this provided that all applicants for a license should pass a careful "examination in materia medica, pharmacy and chemistry." This was the germ of pharmaceutical

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\* The subject of this volunteer paper appertaining to the report of the Committee on Legislation, it is printed in this place as a supplement to the foregoing report.—EDITOR.

legislation in New Jersey, and from that time to the year 1868 various spasmodic attempts were made in the same direction but to no effect. In the latter year another bill was introduced "to regulate the dispensing and compounding of drugs and medicines, and to prohibit the advertising of certain nostrums." This possessed some good features, but the section prohibiting the insertion of newspaper advertisements for abortion medicines was a direct blow at the country press, the lobby was "seen," the bill was killed and editorial virtue was triumphant. In February, 1870, the New Jersey Pharmaceutical Association was instituted, for the avowed purpose of fostering every effort to obtain a proper law, and to bring all legitimate means to bear upon the legislature, the people, and the pharmacists of the State, to make them realize the importance and absolute necessity of such measures. A cordial invitation was extended to every druggist in the State to join, the objects were plainly stated, and the dues were merely nominal. From that time to this not a year has passed without a bill before the House or Senate. Baffled at one point, another scheme has been tried; modifications, amendments, eliminations, everything has been essayed that concerted action could devise. When, in 1873, a committee of nine of the most energetic members of the association had failed to secure the passage of a law similar to that proposed by the national body, the committee was increased so that each county was represented in it. Every man had his work cut out for him, and it was honestly performed. The bill itself was carefully pruned of redundant sections, and legal advice was sought in framing it so that no technical stumbling-blocks should interfere. Copies were sent to *every* druggist in the State, with a circular cordially inviting suggestions of any kind. Again it failed to secure the respectful attention of our legislative Solons. The next move was an endeavor to obtain the signatures of physicians to petitions approving our designs, these to be presented to the legislature. For various reasons, chiefly the supineness of our own members, this scheme came to naught. Again the bill was amended, shortened, altered to suit various objections, again introduced, and again

defeated. Nothing daunted, a change of front was made, and a committee of three selected to take charge of an again amended bill, and sufficient money was appropriated to meet all legitimate expenses. This was during the winter of 1873. Once more we were foiled, but, only pausing for breath, we reorganized our forces by appointing a committee of twenty-two, one from each county, and again we charged the solid phalanx of legislators, only to meet with defeat, made doubly bitter by the knowledge that the bill had passed both Houses, only to be reconsidered, tabled, and lost on motion of a member, the beam in whose eye was the fear that his particular country store would be affected. This beam has been our chronic bane. The above facts were taken from annual addresses of Presidents Dalrymple and Nichols. In 1874, a committee of two, with power to introduce any bill likely to pass, was sent to Trenton. As one of that committee, I can honestly say, that all available means were tried. Every step was discussed, every move carefully weighed; lobbying, "interviewing," influence of many kinds, were all brought to bear, but it mattered not; we are still without a law. And why? For several good and sufficient reasons. First, from the total lack of interest in any reform among the majority of our druggists, in or out of the association. There are at least five hundred pharmacists in the State; of these, about two hundred belong to our association; the average attendance at our yearly and special meetings is about thirty. That is, six-sevenths of our own members, by natural implication, abstained from helping us even by so little as their presence. Add to this supineness the active hostility of a few determined vendors of patent medicines and peddlers' essences, whose yearly opposition in the lobby of our capitol is as regular as the introduction of our bill by us; join to this inexcusable lukewarmness on our side, the mercenary but effective arguments used by our opponents to win over that class of country storekeepers who, by political cunning, have gained seats in the legislature, complete the picture by the bribery of legislative officials to secure the non-engrossment of important amendments accepted by honest opponents of the bill, as was actually done last year;

add these together, and a shrewd notion why we failed can readily be formed. It seems hardly credible that the misrepresentations and positive falsehoods of a few obscure drug-sellers, quack doctors, and essence vendors, should be able to carry conviction to the minds of legislators, when the logical, common-sense arguments of two hundred pharmacists from all quarters of the State fall to the ground null and void. It seems impossible in this nineteenth century of progress to find intelligent-looking men who can coolly say, they believe, as a rule, our druggists are educated enough—that most of the mistakes committed are by graduates in pharmacy—that boys of eighteen months' experience are competent to put up any prescriptions, and are allowed to do so; it does not sound rational to hear of old men, life-long druggists, whose only objection to a pharmaceutical law seemed to be the proposed registry fee of two dollars, yet who, when the obnoxious fee was stricken out, still objected to the law notwithstanding; all these things seem like the shadows of a ridiculous dream, and yet they are very, very palpable facts. And now, is there any remedy for this? Are we called on to be our brothers' keepers, the protectors of the public health and safety willy-nilly, when our beloved brothers and the dear public laugh to scorn our efforts to help them? Sidney Smith once said it required a surgical operation to get a joke into a Scotchman's head—are we to practice trephining on the public skull to introduce an idea? Whether the pressure is to come from the pharmacists, acting on the people, or whether they are voluntarily to say, in Scripture phrase, "come over and help us," that is the problem we are to study, and study carefully, soberly, and faithfully. Whether a general law can be made to cover the requirements of an entire State, or whether it is best to legislate for towns and cities only, leaving the rural districts to their own devices, that is a question we must meet squarely face to face. Sectional jealousies, sordid opposition, bigoted ignorance, all have their weight, and their antidote must be found. But whatever doubts may exist on minor points, one thing is sure, we have put our hands to the plough and cannot turn back; *nulla vestigia retrorsum*. An accept-

ance of the present situation would exhibit a moral cowardice requiring years of future labor to overcome. Do not think for a moment that we of New Jersey mean to give up the contest. By no means. The word "defeat" is not in our text-books. We mean fight! Our forefathers had a sorry time of it for seven years, but they came out ahead; if *our* seven years expire without a victory, why, we will renew the lease and try it again! We look with good-natured envy at the recent success of our New Hampshire brethren, but it will serve to spur us on more vigorously, and it may be that next year we can announce to you that "Ephraim is *not* joined to his idols" any more, for "we have *not* let him alone!"

JERSEY CITY, N. J., August 27, 1875.



# SPECIAL AND VOLUNTEER REPORTS AND ESSAYS.

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## I. PHARMACY.

### THE RELATION OF THE PHYSICIAN AND PHARMACIST.\*

BY E. P. NICHOLS, M.D.

QUERY 48.—The relation of physician and pharmacist. Is the pecuniary compensation of the pharmacist adequate in comparison with that of the physician?

IN consenting to accept this query I was influenced by the fact that it was one in which I had always taken an especial interest, and because the importance of its full and frequent consideration had often been impressed upon my mind. And after writing until I fear your patience will be exhausted, I find some of the more important points left unnoticed. It will, I trust, be further considered by some one better qualified to interest and instruct us on this important subject.

The relation of physician and pharmacist cannot be defined by any single word or sentence. It has been likened to that of husband and wife; but which was entitled to the sobriquet of "lord" was left undecided. Another suggests that the relation is similar to that of father and son, without informing us which is entitled to the parentage. It occurred to me in this connection to prove the superior antiquity of the apothecary by reminding you of the very delicate reference to him in an ancient volume, by which we learn of his unsuccessful attempts to preserve his ointments in "fly-time"—a story which our "frail Professor" has made public by rehears-

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\* Read at the fifth session.

ing it to his class. But in the same old book we learn that the "rapt Isaiah," doctor as well as poet, ordered a poultice of figs; and long before his day we read of a brazen serpent healing all who believed in his curative powers. To perplex us in deciding this point we were informed at the last meeting that the apothecary also is introduced to us just about this period. As a relief to our embarrassment a friend suggested that "the Garden of Eden witnessed the first extract made for medicinal purposes when Eve employed her teeth upon the apple, the active principle of the latter proving such a bitter pill as to tincture the nature of mankind to this day." This would have been conclusive had not further investigation revealed the advice given by a "fellow" (not of the Royal Academy) to this same good mother, that a certain article, which she had been forbidden to touch, was "good for food." Having no earlier history at hand to consult, and not wishing to deprive the medical profession of its laurels, we yield the palm of antiquity to the physician.

That both are very old institutions is an undisputed fact, and their relations to each other and to the community have varied with the times in which they lived. Both drew sustenance from the same fountain-head, and found rest and refreshment, after the long hours of toil, on the same pillow; when, as our late esteemed president informs us, Hippocrates and Galen were eminent not only as physicians, but also as pharmacists. Some here to-day doubtless remember the time when nearly every physician was his own apothecary, compounding his own prescriptions, making his own pills and powders, but not taking them. He was in a great measure independent of the druggist. He carried a supply of drugs in his saddle-bags, or under his cushion, and dispensed them at the bedside of his patient. His office was furnished with shelves and drawers, and he had little intercourse with the druggist, except to purchase medicines to fill them. Then the principal business of the apothecary consisted in having these in readiness for the physician, and in furnishing families with a few domestic remedies and household drugs. He sold his three cents' worth of salts and sixpence worth of senna,



and there was about the same degree of responsibility attached to his business as to that of the grocer or baker. It is true he was expected, according to an old writer who undertakes to define the duties of the apothecary, "to know how and when to plant, gather, and preserve his herbes, seedes, and rootes," and to understand their nature. He is also warned "not to buy or sell rotten drugges," nor "to put in *quid pro quo*," on those rare occasions, when an opportunity is afforded for compounding a physician's prescription.

But as the physician has exchanged his saddle-bags for the pocket-case, to be used only in an emergency, and as he depends almost entirely upon the pharmacist to honor his drafts, their relation to each other and to the community has also changed. It is now more like that of brothers whose interests are almost identical, and it is impossible for these interests to conflict without injury to one or both parties concerned.

The relation of the pharmacist to the community is peculiar, differing in some respects from that of any other business or profession. A man goes to the baker or grocer, or to the market, and leaves his order, without the slightest hesitation, expecting, as a matter of course, that it will be correctly filled. He does not stop to inquire if the butcher is sure his meat is not too antiquated, nor does he warn the grocer not to send him salt for sugar. He pays their bills without grumbling, and eats his dinner with a great deal of satisfaction; but when this dinner disagrees with him, and he suffers the tortures resulting from an imposition on his digestive apparatus, when the excesses of youth draw on his older experience, and he is compelled to visit the druggist for relief, he is a changed man. His confidence is gone, and he immediately becomes suspicious. He sees a twinkle in the eye of the apothecary, and calls to mind the stories of some of the old alchemists who were said to be in league with the devil; he watches every movement, and receives the potion prepared for him as if he were a doomed man. In no very pleasant mood he asks "what's the swindle?" and takes his departure, thinking it will be final. The *solacing* effect of his

manner on the mind of the sensitive apothecary never enters his thoughts.

The druggist is too often placed in an unpleasant position by the questions of his customers. He is asked, for example, if a prescription just compounded contains quinine or calomel, or something of the kind, to which a certain class in every community, without any reason, object. His manhood revolts at the idea of sacrificing the principles he learned at his mother's knee, and he "can't tell a lie." He remembers that physicians often wish to conceal from patients the nature of the remedies they take, and that they are especially careful with just the class of patients who ask such questions. What the doctor has said respecting the medicine he has no means of knowing. He would not do nor say anything to injure the physician, nor does he care to offend his patron. On which horn of the dilemma shall he hang? He has little time to think. He is not always an adept at subterfuge, nor can he always successfully prevaricate. Is it strange that he sometimes errs in judgment on such an occasion? Should he be condemned by the physician if, not being infallible, he makes a mistake in his own favor? And yet it is in just such cases that the physician does condemn the druggist, and that too without a hearing. The patient returns to the doctor, asking why he prescribes such remedies, or saying he cannot or will not take them. The doctor goes in a somewhat excited state to the druggist to know why he has revealed the contents of his prescription. There he becomes more excited; in fact they both get in a passion; neither are in a condition to give or receive explanations, and they separate in no very friendly mood; and the physician does not urge his patients to go out of their way to enlarge the income of this druggist. These things ought not so to be, but we are all human.

In such cases the advantage usually is on the side of the physician, who can well afford to be magnanimous. He holds a social position which no other profession or calling can hope to attain. And this is not because of superior moral or mental qualities, but on account of the peculiarly intimate rela-

tions that must exist between physician and patient. He is an ever-welcome visitor in the family circle, and his opinions are received with respect, and in many instances with a certain degree of awe. In the little sicknesses to which all are liable, as well as in cases of serious disease, he is summoned, and by day and by night, in sunshine and in storm, he is expected to respond to every call, and administer relief to the mental anxieties as well as the physical sufferings of his patients. Family secrets even are not withheld from him, family delinquencies are often revealed to him, and he is sometimes an unwilling witness to family jars. The same hand that assists in bringing to life often closes the eye in death. Occupying such a position, and holding such a relation, how easy is it for him to exert an influence for good or evil, to benefit or injure another's reputation! A word dropped carelessly or with intent may produce an injurious impression, which a lifetime will not eradicate. One who would not openly condemn another as unworthy of confidence, will sometimes, by a shrug of the shoulder or by insinuation, accomplish the same result. We believe the physician should have the implicit confidence of his patient, but when he takes advantage of this confidence to injure the reputation of another, he degrades his profession, and places himself in the position of the judge who decided that the "court was an object of contempt."

It cannot be denied that the druggist is sometimes indiscreet, when conversing with customers in regard to prescriptions. The manner of suggesting that the medicine is powerful, or the dose large, excites suspicion in the mind of the patient, and if he be of a nervous temperament, he will probably return to the physician for his assurance that no mistake has been made, from which the physician receives the impression of unnecessary interference on the part of the druggist. The writer is cognizant of a case where an apothecary remarked to one for whom he was preparing medicine, "that he need not flatter himself that he did not have heart disease," which not only alarmed the patient, but coming to the ears of the physician so incensed him that he resolved in future to

send his prescriptions elsewhere. In this case the remark was not only uncalled for, but reprehensible, as the physician had studiously avoided any reference to the disease in the presence of his patient, in order to prevent the excitement which might result from a knowledge of the fact. The druggist overstepped the bounds of ordinary civility, and was guilty of meddlesome interference, and we cannot blame the physician for taking umbrage at such a course. But we are inclined to believe this to be a rare occurrence. As a rule druggists make an effort to cultivate the friendship of the medical fraternity, avoiding everything calculated to produce an alienation of feeling. The most careful physicians will sometimes make mistakes in writing prescriptions. Nor is it strange when we think of the innumerable questions asked them by anxious friends while they are thus engaged. The right-minded pharmacist will use all his tact to conceal these errors, and spare no effort to have such prescriptions speedily and correctly prepared. The druggist has been styled the physician's "safety-valve," and the instances are not uncommon where he has stood between the practitioner and the death of his patient. If the doctor commits a blunder, he has a safeguard in the competent pharmacist, but if the latter makes a mistake nothing but the hand of an overruling Providence can avert a fearful catastrophe.

May we not then, with propriety, compare the relation existing between the physician and pharmacist to that of brothers whose interests are nearly allied? Should not the most perfect harmony exist between them, courtesy and good feeling characterize all their intercourse, and mutual concessions be made, and mutual forbearance exercised whenever occasion may require?

Before leaving this part of our subject we would refer briefly to a relation existing between some physicians and pharmacists, which, though probably not contemplated by the author of this query, deserves a passing notice; we mean the practice of giving a percentage on prescriptions, a practice which deserves and should receive the disapprobation of every member of this body. The impression too generally prevails

that this is customary with all druggists, and when a man is obliged to pay half a dollar for an ounce mixture, and he cannot be informed that the little vial contains forty cents' worth of quinine, is it surprising if he sometimes infers there is collusion between the doctor and druggist? We are sorry to be obliged to confess that there is any ground for this impression, but we have no hesitation in saying that the great majority of our associates are entirely innocent of any such arrangement, and we have too high an opinion of the medical profession to believe that many of their members would propose or consent to anything of the kind. Not long since, however, an exception was known to the writer in the person of a physician who declared openly, without the slightest compunctions of conscience, that druggists should give a percentage on all prescriptions. If we do not despise the man we condemn *his* avarice, who, having bled his patient as much as the law allows, would ask another to take the last drop from his already too exhausted fountain of subsistence. On what ground the well-paid physician bases his claim for a percentage from the poorly compensated apothecary I have never been able to discover. After receiving a dollar for writing an office prescription, is it not a small business to ask of the druggist five cents from the little profit he has made? It might be styled a genteel way of robbing either the patient or the family of the druggist. We know of a physician holding a respectable position in society who sells himself daily for this contemptible sum, and we regret that any druggist will consent to comply with such an unreasonable demand. If any one thinks we are overstepping the bounds of propriety in thus speaking, let him remember that the irregularities of a few affect the reputation of our whole fraternity. We are endeavoring to raise the standard of our profession, and this is a burden we cannot afford to carry. Let us command the confidence of the medical profession by strict attention to all the little details of our business, by promptness and neatness in executing their orders, and by care in the selection and purchase of those articles on which often the success of the practitioner depends. So shall we also win that confi-

dence of the community which will enable us most surely to reach the goal of our cherished hopes.

Little need be said to convince those most interested that the compensation of the pharmacist is inadequate *per se*. We are often told that the profits of the druggist are enormous, that everything is sold at an advance of two or three hundred per cent., and that we are all coining money. We know of no better way to convince our judges of their error than to let them take our places. If we inform them that the sales which furnish us unusual profits constitute but a small portion of our receipts, they manifest their belief in the credibility of our testimony by a smile. It is useless to tell them that, while we are disposing of an article for half a dollar, our neighbor, the jeweller, will persuade his customer to purchase a set on which he realizes as much profit as our whole day's business affords. In vain we ask them to point to a case where one of our profession has enriched himself by his business alone. We do not deny that some who are called druggists have acquired wealth by operations with which their silver-coated pills had no connection, or by circumstances entirely independent of the sale of medicines; but it is almost impossible to find one who, after devoting his whole life to the legitimate business of the druggist, has left a large fortune to be quarrelled over by his heirs.

But is the compensation of the pharmacist adequate when compared with that of the physician? We answer unhesitatingly in the negative, and will give briefly our reasons for this decision by a comparison which all will appreciate. The physician uses his own residence for an office, requires no capital but his brains, and employs no assistants. His expenses are trifling. The pharmacist finds it necessary to secure an eligible position for his business at an expensive rent, to invest a small fortune in stock and fixtures, and to employ competent clerks, who command good salaries, all of which make a heavy draft on his profits. The physician makes ten, twenty, and sometimes thirty visits, placing each day a snug little sum on his ledger; the druggist, after working more hours, finds he has scarcely cleared his expenses. The one retires

from his office with ten dollars received for advice; the other closes his store at a later hour, having realized little beyond the cost of his gas.

The tyro in medicine we know is often obliged to wait long and patiently for that practice from which he hopes to build up a fortune. He must do a great deal of work for little or no compensation, except the heartfelt satisfaction arising from acts of benevolence. So also the druggist must stand in his lot early and late for years before realizing any satisfactory result from his labors. It takes a long time to gain the confidence of the community, and steady perseverance to retain it. He is expected to be a public benefactor, to know everything and everybody. His store is a general waiting-room, his newspaper and directory are public property, and he is supposed to be such a liberal soul that no one desiring assistance ever passes him by. No society is willing to hold a fair without giving him an opportunity of adding to its bazaar.

One more illustration and I have done. A physician sat enjoying the cool evening breeze as it bore away the fragrance of the weed with which he was wont to be consoled in his waiting hours. He is startled from his reverie by the entrance of a gentleman desiring his immediate attendance on one of his family, who has been taken suddenly and alarmingly ill. The physician demurs, because it is an hour when he is expected to be in his office. The gentleman insists, and the doctor consents to go, on the usual conditions, that he shall receive a double fee for leaving his office during office hours. He is absent about half an hour, and returns with four dollars in his pocket. On the same evening a druggist happens to be alone in his store, when a prescription is handed him, requiring nearly half an hour for its careful preparation. The cost of the material itself is trifling, but considerable knowledge and skill are required to compound it successfully, and the compensation he receives is sixty cents. The pharmacist had spent six years in acquiring this skill and knowledge; the physician had done the same. Each may have saved a valuable life. We do not say the one received too much, but was the other adequately compensated? The



pharmacist was unfortunate in being alone on this occasion, for while he was at work with the prescription several customers left his store, and he probably lost money by the operation. How many patients the doctor lost we are unable to say, but we know his evening's work was decidedly more profitable than that of the druggist, and we are satisfied he would not willingly exchange places with his dispensing and indispensable colaborer.

NEWARK, N. J., August, 1875.

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## PROGRESS OF THE METRIC SYSTEM.\*

BY FREDERICK BROOKS.

THE present moment seems to be a favorable time for the druggists of the United States to take some decided action with regard to the adoption of the metric system of weights and measures.

All thoughtful persons, of course, agree that concerted action, not merely of individuals, but of nations, is needed to insure a thorough and useful reform in so vital a matter. Although national prejudices have been very slowly and reluctantly laid aside, there is now actually visible some harmonious action. An international commission, composed of scientific men, met in Paris in 1872, and with every precaution to insure accuracy attended to the preparation of standard metre-bars for distribution among their several national governments. And in most countries the metric system is not merely legalized, as it was in the United States in 1866, but is actually in use among the people. In France, where the system originated, in the neighboring countries of Belgium, Holland, and Switzerland, in Denmark and in the various nations of southern Europe, and in our younger sisters on this side of the Atlantic, Mexico, Brazil, and South America, its in-

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\* Read by title at the sixth session.



troductioin might not seem to us very noticeable; but that the British, in spite of their conservatism, made it obligatory in India in 1870, and that the Germans, with their inveterate aversion of France, adopted it exclusively in 1872, are facts that confront us with the inquiry whether we are not falling behind the times. For the sake of encouraging international acquaintance and good-will, as well as to benefit ourselves in commercial transactions, we ought to be astir.

Druggists, from the nature of their business, are deeply concerned with weighing and measuring, and so long ago as 1859 an exceedingly valuable and elaborate report upon the subject was presented to the American Pharmaceutical Association by Alfred B. Taylor. He looks forward generations, possibly centuries, for the ultimate success of his scheme; and has reason to do so, for he goes to the bottom of the subject, and begins by proposing to reform our arithmetic, doing away with the familiar notation of units, tens, and hundreds, the Arabic numeration, as we call it, and instead making a figure stand for EIGHT times as much in one column as in the next. Probably most thoroughly trained mathematicians would recognize this as a very great improvement; but it is one that is scarcely to be thought of in the immediate future.

So deeply is the decimal arithmetic ingrained in the ordinary educated mind that it would take about half an hour to make most men understand at all what is meant by such a change. By introducing the metric system everywhere we should seem to be putting ourselves somewhat further from the consummation so devoutly hoped for by Mr. Taylor and others; but, in fact, the distance is so great in either case, that the use of the metre would not materially alter our position. A change of standard is but a drop in the bucket, when compared with a change of arithmetical notation; the one revolutionizes the human mind, the other teaches it a few new words. Moreover Mr. Taylor himself recognizes as fully as any one the importance of international uniformity, toward which such long strides have been taken since the publication of his report. In order to urge other nations to

adopt eventually what we believe to be the best system, must we not begin by showing a willingness to agree with them at first in using what the majority of the nations has already established?

During the lengthy interval that must elapse before the completion of any such sweeping reform as Mr. Taylor's, we should derive immense advantage from using the beautiful simplicity of the metric system instead of the present confusion.

How great this advantage is, it is not necessary to dilate upon before men who are already using the litre and the gram in a considerable portion of their work.

But with regard to the general introduction of those standards into common use, it is to be said that this class of men are in a position especially to be appealed to. They have the new measures, which are hardly more outlandish than those old ones with which they have been serving the public; for drachms and scruples are a mystery to most of the unprofessional; and if they would introduce the practice of selling, and not merely compounding, by the decimal system, and would put up their goods in packages, weighing, for example, one kilogram, which customers could take in their hands and carry away, they would do a great deal toward familiarizing the community with the French units. That is what is required for completing the reform. There is no trouble about decimal division; everybody is familiar with that; but scarcely any one knows whether a kilogram of butcher's meat will feed a family or a regiment; or can tell whether his own nose is a metre or a centimetre long. Every street-boy can reckon the decimal subdivisions of Federal money with great promptness and accuracy; but how many citizens of this Athens of America know that a five-cent nickel weighs five grams?

One thing more remains to be said as to the ripeness of the times for such a movement. There is throughout the community a readiness for this change, greater probably than is generally supposed. Decimal nomenclature has been used in scientific books, and taught in schools for many years. More-

over, recently, the leading architects of the country have agreed to use the metric measures of length in all their professional transactions after July 4th, 1876. The American Metrological Society supports them in this movement. To make it a thorough success will require a long pull, a strong pull, and a pull altogether. Will not the Pharmaceutical Association join in the effort?

September 2d, 1875.

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## HOW TO IMPROVE THE PRACTICE OF PHARMACY.\*

BY ROBERT W. GARDNER, JERSEY CITY.

THIS question, though ably considered by wiser heads than the writer's, does not yet seem fully answered.

A thorough pharmaceutical education required as a necessary qualification is at once admitted as indispensable, but a high moral tone is quite as necessary. A man possessed of every educational qualification, yet lacking honest principle and moral probity, may not use his knowledge for the best interests of his profession, nor is moral suasion of much use under such circumstances; mankind is prone to regard self-interest as paramount to other considerations, and material welfare and present gain receive more attention than conscious rectitude and sense of duty, nor is it more possible to confine our business to persons of strict integrity than to compel proper qualification; the pharmaceutical conscience is not more virtuous than others. If then, self-interest plays such an important part in the practice of our profession, cannot we use it to raise instead of allowing it to degrade our calling? But how? I answer, by making a confidant of the public. People buying ordinary necessities of life, or anything which is sought to fill daily wants of a household, use careful consideration in making selection; this is because they

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\* Read by title at the sixth session.

have learned by experience and otherwise, that without such care they will be imposed upon, and being acquainted with qualities they use critical judgment. So it would be with our business were the public a little better informed with regard to it, but at present so little is known of it that it is considered almost a black art, and so great is the undefined dread of mistakes, that many timid persons, while having prescriptions compounded, consider their chances as three to one in favor of the undertaker.

This proves the lively though unintelligent interest taken by our patrons in our calling, and were they taught how to discriminate between well-educated properly qualified pharmacentists and pretenders, and told of the frauds and sophistry practiced, and the shrewd plans by which those of elastic consciences reap unhallowed gain, they would become our allies not only, but supporters also, and would thus insure us the victory.

Take your customer, for instance, into your store-room and work-room, explain to him that your herbs are carefully selected at those various stages of development when their medicinal activity is greatest, thoroughly dried, and kept in cans excluded from the air, to prevent mould, loss of strength, and insect ravages; tell him that your ointments are benzoated as a protection against rancidity; enlighten his mind as to how rotten and worm-eaten roots, etc., may be and frequently are used for making those preparations upon which the physician relies in cases of extremity to save human life; then, by way of contrast, exhibit your stock of such substances fresh, clean, and reliable. Explain that thorough pharmaceutical attainments are as necessary for the proper manufacture of the simplest preparations on our shelves as the most elaborate, that unless the principles involved in the various processes employed are thoroughly understood, that without a knowledge of the nature and composition of the materials used, and a proper study of the nature of those principles upon which the medicinal activity of drugs depend, that no preparation of them, no matter how simple, can be relied upon; let him see all the various processes in

operation, and explain every step to his comprehension, answer all of his curious questions honestly and candidly, and you will have an interested and patient listener—do not be afraid, he is not disposed nor able to start in competition—do this, and you have not only secured a customer but made a friend, raised yourself in his estimation and lost nothing, made a special business agent, who will talk for you and sound your praises where your voice could never reach, and his efforts in your behalf are more apt to be successful as he works for love and not for money. You have shown him that though you do business for a livelihood, you have also a heart and conscience, as is evidenced by your solicitude for the welfare of your patrons and your conscientious discharge of duty; you have elevated your profession by proving yourself an honor to it.

By thus inviting your customers into your work-room, you also stimulate your employes to greater care and nicety in cleanly manipulation, and to greater efforts in acquiring knowledge. Do not confine yourselves to this mode alone; seek all channels to educate the popular mind as to the qualifications and requirements of our business. Our interests, our reputation, the attainment of the objects which our association has in view, the welfare of the public at large, the triumph of right over wrong, would all be directly influenced if not secured by this course.

“Self-preservation is the first law of nature.” The people know something of the vital importance of our calling, as shown by extreme anxiety while having medicine prepared, but their knowledge is so limited in regard to the whole subject, that they are incapable of exercising an intelligent discrimination, and are at present more apt to patronize and support the plausible and enterprising, though incompetent and unprincipled followers of our business, than those who, fitted by education, study, experience, and moral responsibility, are those only into whose hands should trustingly be placed that most highly prized of earthly possessions—life.

Do you not suppose that their interest in this subject is

sufficient to induce them, *if qualified*, to select those best suited to fulfil the great responsibility resting upon us?

Want of knowledge among the people regarding all relating to medicine and their own organisms, explains the principal cause of the encouragement given to quackery and empiricism.

As ignorance and superstition make way for enlightenment and knowledge, our profession will take its stand where it belongs and be appreciated as it deserves.

Let ours be the duty and privilege of carrying out, as far as we are capable, this very desirable result.

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### IMPROVED METHOD OF PACKING HERBS.\*

BY A. W. MILLER, M.D., PH.D.

THE customary style of putting up herbs in compressed and sealed packages is connected with many serious and well-known disadvantages. Although these objections have been frequently pointed out by teachers of Materia Medica and others, but little effort seems to have so far been made towards their removal. One of the worst features of the present style is, that the pharmacist is debarred from personal inspection of the contents of the package which he is handling. The drugs may be good, bad, or indifferent; they may even be worm-eaten, adulterated, or mouldy, still they are handed out on the faith of the packer's name or trade-mark, on whom all responsibility is conveniently shifted, while the apothecary is himself absolutely reduced to a mere tradesman or shopkeeper, in the most objectionable and degrading interpretation of the term. For proofs of the very frequent substitution and sophistication of botanical drugs, in many cases due solely to ignorance, I need but refer to the report of the Committee on Adulterations offered at this meeting. In cases where incorrect labels have been affixed to packages by accident or negligence, the chances of discovery are reduced to a

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\* Read at the sixth session.

minimum. The studious apprentice is practically almost entirely prevented from becoming familiar with the drugs that he is expected to be thoroughly conversant with. On the other hand, the public is educated to ask for certain brands of herbs in preference to others, almost as though these were patent medicines under another garb, when perhaps the very drug is growing in profusion, and in the greatest perfection, within a stone's throw of the identical pharmacy.

The process of packing herbs with powerful pressure has also the special disadvantage that it reduces the bulk so materially, that the quantity handed out to the customer seems insignificant and entirely inadequate as an equivalent for his money. In but too many cases the drugs are pressed before being thoroughly dried, and they consequently become mouldy or musty in the interior of the package. It is well known among the trade that a paper of a pressed herb or root rarely weighs what is claimed for it, entailing just that much additional loss on the druggist.

On account of these and other weighty objections, very many of our most conscientious pharmacists, including almost without an exception all of our German apothecaries, have entirely discarded the employment of botanical drugs in pressed packages. They hold it to be their evident duty to purchase all these commodities in bulk, and then to have them carefully garbled over on their own premises, rigidly rejecting all adulterations, impurities, or inert and damaged portions. There is such an abundance of time to spare in the average retail drug store, that it may be regarded rather as a boon than otherwise to furnish a little additional employment.

In venturing to offer a new style of patented contrivance for the purpose of putting up herbs and other drugs, I must premise by stating that the packages exhibited herewith are sold by the manufacturers at rather lower rates than corresponding styles of plain boxes. Nor do I wish to be understood as exclusively recommending this particular style of patented package; others may possibly be brought forth possessing equal or perhaps even greater advantages, but so far



I have met with none so well suited for this special application. The present paper has been prepared entirely without the solicitation and even without the knowledge of the manufacturers of these boxes, and its main object is to induce pharmacists to pack their own herbs, unless they prefer to sell them in bulk.

My attention was first called to the products of the Novelty Paper Box Company at the exhibition of the Franklin Institute in our city last fall. Being impressed with the eminent adaptability of these boxes for the purpose in view, I had a number of them prepared of the proper size, which, when filled and labelled, leave little more to be desired on the point of elegance and convenience. It will be observed that the entire box is constructed of one piece of pasteboard, the opposite extremities being firmly stitched together with flat wires. The ends are scored inside, so that they readily fold over. One of the flaps at each end is fashioned into a T-shaped tuck, while the opposite one has two oblong holes punched into it, fitted to receive and retain the flap, in this manner making a very neat and compact package. While these boxes are in their flat or unexpanded form, they occupy but very little space, so that in transportation they take up a comparatively very small amount of room. Before being stitched, they can be imprinted on all sides, when this is preferred to subsequent labelling, thus insuring a dry package by dispensing altogether with paste.

Particular attention is called to the fact that the boxes exhibited herewith are of just sufficient size to contain one ounce of an herb without the necessity of employing a press or other expensive apparatus. I can conceive of no valid reasons why druggists should not purchase or collect their own herbs, and then put them up in this manner for retailing. In Europe it is customary for apothecaries to employ their apprentices or other persons in gathering such botanical drugs as are met with in their immediate neighborhood. This practical education in botany is certainly highly beneficial to druggists, who, as a class, are prone to suffer from those affections which are induced by too much confinement in close



apartments, too little open-air exercise, and too little exposure to direct sunlight.

The contents of the boxes submitted herewith can be inspected with the greatest facility, without spoiling the appearance of the package or defacing the labels. The druggist can assure himself of the correctness and quality of the drug he is handling, as it is nearly in its natural state. The purchaser receives a much larger package than usual, from which he can remove as much as he may require, and which he can again readily close and preserve intact for future use.

In conclusion, I cannot refrain from making a strong appeal for the active prosecution of botanical studies, if only for hygienic reasons, and entirely aside from their scientific or commercial aspect. If the aspirant to pharmaceutical honors does not wish to condescend to the gathering of herbs and flowers for profit, he certainly will not object to "prospecting" in the fields and forests surrounding him in order to ascertain what plants are available, and where they can be found in the greatest profusion. The pursuit of the study of botany affords so much genuine and unalloyed pleasure, that when a taste for it has once been acquired, it will surely be persisted in, and it may thus be instrumental in saving many a valuable life from the untimely grave of the consumptive.

PHILADELPHIA, September 5th, 1875.

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## ON DRUG-MILLS.\*

BY ANDREW BLAIR.

QUERY 1.—An essay on drug-mills now furnished by the manufacturers, giving practical advantages of the various kinds, and the results of experiments proving their ability to produce powders fine enough for most pharmaceutical purposes, if such exists.

It is scarcely necessary to speak of the great importance of this subject; it is one that interests every apothecary in the

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\* Read at the fourth session.

land. A good drug-mill is one of the most valuable and useful implements a pharmacist can possess. It enables him, with comparatively little time and labor, to reduce to a proper condition for dispensing or manipulation a large proportion of the substances he has to deal with.

The improvements in machinery, utensils, implements, etc., are no less desirable in the practice of pharmacy than in any other branch of manufacturing or trade. The demand for labor-saving machines has been constant and very urgent. That which will perform the most work in the best manner, shortest time, by the use of the least labor, and at least expense, is eagerly sought after.

The pestle and mortar have been in vogue from time immemorial, and until a few years past were about the only instruments by which the apothecary was able to reduce his drugs to a condition for percolation, etc. Although since then drug-mills and other appliances have been invented, some still hold to the brass or iron mortar as the best mode.

It certainly is in many cases, and no apothecary store or laboratory is complete without it.

But the progress of the times demands a more expeditious manner of reducing substances, and hence the great competition of late years in introducing mills suited to the use of the retail apothecary.

Mills of various kinds have been in use many years for grinding on a large scale, but few, if any (until late years), for small operations, and worked by hand.

Coffee-mills have been brought into use in some cases, but they are not strong enough, and are not capable of being cleaned after each operation, which is a very important matter.

The various mills now found in the market are known as Swift's (old style), Thomas's, Hance's, Tröemner's, Enterprise, Swift's Champion, Swift's New Mill. We shall endeavor to give as full a description as possible of each as to their advantages and disadvantages (if they have any), and make a few suggestions of improvement in some.

*Swift's (old style).*—This was formerly manufactured for A. B. Sands & Co., New York, and sold by them. It is now in

the hands of W. H. Schieffelin & Co., New York, as agents. It consists of two vertical grinding-plates, one of which is made fast to a frame, the other secured to a horizontal shaft, to the end of which is attached a fly-wheel. The whole is supported on a frame or legs from the floor. These are made of wood. It produces a powder as fine, if not finer than most other mills, but grinds very slow, and requires considerable labor to do the work. It is very troublesome to clean, being necessary to take it almost completely to pieces before the grinding-plates can be got at.

FIG. 56.

Swift's "Old Style." Price, \$8.00.

It has no receptacle for the powder, a box of some sort being provided by the operator. This is a disadvantage, as it allows the finer portions of the powder to fly about.

We find quite a number of these mills now in use, and many of those who now have one of the more recently invented machines formerly had a Swift's, showing that they were in very general use.

*Thomas's Mill.*—This is made by J. M. Maris & Co., Philadelphia. It consists of two horizontal grinding-plates, the upper of which is stationary, and the lower one revolving. They are inclosed in an iron box supported on three iron legs, all fastened together by screw-bolts and nuts. The motion is communicated to the lower plate by a vertical shaft which is geared to a horizontal shaft by cogwheels, one of which is about twice the size of the other; on the end of the horizontal shaft is a heavy flywheel. Each revolution of the flywheel produces about two revolutions to the lower grinding plate.

It grinds faster than the Swift mill, and quite fine enough for the ordinary uses of the apothecary.

The construction of the machine is objectionable in having so many separate parts fastened together by screw-bolts, the jarring during the process of grinding having a tendency to work them loose, and if not kept constantly screwed up tight will run the risk of breaking the mill by bringing an undue strain on some one part of it. The fineness of the powder is regulated by a thumb-screw, which operates on the vertical shaft, raising or lowering the revolving plate.

FIG. 57.

Thomas's mill. Price, \$15.00.

Having several bearings for the shafts, and but one wheel, it creates considerable friction, and an uneven strain on the several parts, and consequently requires more power to work it. It does not feed well. The powder, after being ground, lodges under the lower plate in considerable quantity. It is not so troublesome to clean as Swift's mill, but more so than others we have seen. It has no closed receptacle for the powder. It can be fastened to the top of a counter.

*Hance's Mill.*—This is made and sold by Messrs. Hance Bros. & White, Philadelphia. In principle it is similar to the Thomas mill, but in construction it is quite an improvement. It is a much heavier and stronger machine than any we have seen. It consists of a hopper above, which is cast in one piece with what forms the upper part of the inclosure for the grinding-plates, on the under side of which are cut the teeth that form the upper or stationary grinding-plate. The lower

revolving plate is conical in shape, the centre of which is prolonged, forming a point, with several flanges on it, that acts as

FIG. 53.

## HANCE'S CONICAL PLATE DRUG AND SPICE MILL

This style, with stand for bolting to the floor.  
Price, \$30.00.

This style, for bolting to a counter or table.  
Price, \$25.00.

a breaker for large pieces. Underneath this revolving-plate, and fast to it, is a projection called a scraper, which is intended to remove into the outlet the powder that lodges and

accumulates in the lower part of the inclosure for the grinding-plates.

This revolving plate is secured to a vertical shaft by a clutch. This shaft has a cogwheel made fast to it, which gears with another cogwheel (double the size) secured to the end of a horizontal shaft, which has a heavy flywheel at the opposite end.

The fineness of the powder is regulated by a thumbscrew at the base, which is so contrived as to raise and lower the vertical shaft, and with it the revolving-plate at its top, thereby bringing the grinding parts in closer contact with each other, or the reverse, as desired. This whole arrangement is supported on and held in place by a stout iron frame cast in "one piece."

This mill has some advantages, and also some points for improvement. It grinds finer, as a general thing, than any we have examined, but requires considerable power to work it. It grinds about as fast as any.

It is rather too heavy a machine to be fastened to the top of an ordinary counter, but will work very well if it (the counter) is properly strengthened and braced.

Some of these (Hance's) mills are constructed on iron stands reaching from the floor. This is quite an advantage in some cases.

It is well adapted to grinding large quantities of material.

It is capable of breaking up larger pieces better than most other mills.

It does not have a closed receptacle for the powder.

In the following particulars this mill could be greatly improved :

The two parts of the inclosure for the grinding-plates are fastened together by four bolts and nuts. The holes through which these pass are not interchangeable. The top plate and hopper it is necessary to put on in one certain position, or the holes will not meet.

It is a great disadvantage to have many separate or detachable parts about a machine. These four bolts and nuts (making eight pieces) are small, and it is necessary to remove them each time the mill is cleaned.

They are very liable to get lost or mislaid, much to the annoyance of any one who wishes to use the machine.

This could be improved by having the head of the bolt operate by a hinge and a slot cut in the upper plate, at each point where there is a bolt, for the bolt to swing into.

The scraper does not do its work as well as it should. The finer you grind a substance the more is allowed to lodge in the mill under the lower plate, because it (the revolving-plate) is forced up closer to the upper plate by the regulating-screw, and, of course, brings with it the scraper, and consequently leaves more space untouched by it.

To remedy this we would suggest that the lower part of the inclosure be made a different shape, that the powder will pass out without the need of a scraper.

An inclosed box or drawer would be a great improvement to this mill, and it could be very easily attached.

The advantages of this are easily understood, especially by those who have need to use a mill in their store apartment.

*Tremner's Mill* (made by Henry Tremner, Philadelphia). —This is similar in principle to Swift's (old style), but in construction a great improvement. It is very compact, can be screwed to a counter-top very easily, and takes up little room. It consists of two vertical grinding-plates, one of which is stationary, being made fast to an iron frame; the other is secured to a horizontal shaft, and revolves. At one end of this shaft a thumb-screw operates against it to regulate the fineness of the product; at the other end is a flywheel.

Above is the hopper, and

FIG. 59.

Tremner's mill. Price, \$16.

below the grinding-plates is an inclosed drawer, fitting tightly into the base of the mill ; into this the powder falls.

The plates are made of the best cast-steel. It grinds very fine, but slow, and requires considerable labor to work it.

The inclosed receptacle for the powder is a great advantage.

It has rather a small throat, and will not take in as large pieces as the Hance mill. The arrangement of the teeth is such that they retain the substance being ground too long, and cause it to clog up more readily than it should. A little alteration in this particular would be an improvement.

It is not as easy to clean as some other mills. It is a very good machine for small operations.

*Enterprise Mill.*—This is made by the Enterprise Manufacturing Company, of Philadelphia.

FIG. 60.

Showing mill open.

It is constructed somewhat different from any mill we have noticed.

It consists of a cast-iron box in two parts, the upper part of which serves as a hopper, and part of the inclosure of the



grinding-plates, and is secured to the lower part by a hinge on one side and a screw-bolt on the other.

The lower part acts as a support for the shaft, etc., and contains also an inclosed drawer (which fits tight into it) to receive the powder.

The grinding parts consist of a shaft (horizontal) on the centre of which are the two plates, one being made fast to it, and the other one loose, when the mill is put together to work. This loose plate fits into several niches on the interior of box, which hold it stationary. On each end of this shaft are flywheels of equal size and weight.

It does not take up any more room than, perhaps, the Trœmner mill. It is easily secured to the top of a counter, and grinds faster than almost any other mill.

FIG. 61.

Enterprise; several sizes. Prices from \$8 to \$16.

It does not require as much power to work it as some others.

It grinds almost as fine as any we have noticed. The fineness is regulated by a screw at the centre of one of the flywheels.

It is cleaned with less time and labor than any other mill, and this is one of its greatest advantages over all other mills.

A few seconds only being necessary to loosen "one" screw, turn the hopper over on the hinge, and the plates are entirely exposed to view.

It has no loose or detachable parts to get lost or mislaid, the several parts of the machine being fastened together by hinges.

It is about as compact as any other mill. The grinding-plates are made of Franklinite or gray iron, which it is claimed is harder than steel.

The receptacle for the powder is a tight-fitting drawer, which prevents any escape of the finer portions of the powder.

A small portion of the substance remains in the mill after the operation is completed; this can be brushed in a moment's time into the receptacle below by the use of a feather. No mill that we have ever examined is entirely free from this fault.

*Swift's (new style) Mill.*—This is similar in construction and principle to the old Swift mill, except that it has a round

FIG. 62.

FIG. 63.

Swift's "New Style." Price, \$9.00.

Swift's "Champion." Price, \$18.50.

hopper, and larger, heavier flywheel. Made and sold by W. H. Schieffelin & Co., N. Y.

*Swift's Champion Mill* is an improvement over the old style, in having two flywheels, one on each end of the shaft. In other respects it has no advantages that we can see. Made and sold by W. H. Schieffelin & Co., N. Y.

*Swift's New "B" Mill.*—This is similar in some respects to the Hance mill. The points of difference are—

FIG. 64.

Swift's new "B" mill, ready for use. Price \$20.00.

1. The grinding-plates are flat, not conical as in the Hance mill.

2. The hopper and upper grinding-plate are secured to the lower plate by a hinge and "one" bolt, as in the Enterprise mill.

3. The horizontal shaft has a flywheel at each end of it.

The second point is a great improvement as to convenience, and the third point as to the greater ease with which it is worked. It can be secured to the top of a counter. Has no closed receptacle for the product. Is not capable of breaking as large pieces as the Hance mill, because the central point of the revolving-plate is not long enough. It grinds fine enough for the ordinary uses of the apothecary, and about as fast as most of the mills we examined.

The most important qualities for a drug-mill suited to the use of the apothecary are—

1. Compactness.
2. Ability to produce a fine powder with as little labor as possible, and in the shortest time.

FIG. 65.

Swift's new "B" mill, open. Price, \$30.00.

3. Convenience and ease with which it can be taken apart to clean.

4. Having a closed receptacle for the powder, to prevent its flying about.

5. Simplicity and cheapness.

In our judgment, the Enterprise mill meets all these requirements more perfectly than any mill now in the market. Still it could, and no doubt will, be made to grind a finer powder than it now does.

Next to this we would mention the Hance mill, which, with the improvements suggested, would make it the best machine the market affords for heavy work.

For small quantities, and where room is a matter of consideration, Tröemner's mill is the next best to the Enterprise.

The old Swift mill is an excellent machine considering the

price, and without hesitation we recommend it to any one who is not able to invest in the higher-priced machines. We submit a few samples of powders, but they are not a fair example of the work these mills will turn out, as the conditions of the weather were very unfavorable for grinding fine.

We have endeavored to give a fair and impartial statement of the advantages and disadvantages of the various mills now furnished by manufacturers, taking a practical view of the matter, and hope it may result in stimulating these parties to make further effort to improve their machines and make them still nearer perfection, and also that it may induce many of the apothecaries of our land to provide themselves with a machine best suited to their particular wants and circumstances, and thereby incline them to make the most if not all of their own powders and preparations, and not be dependent on the general market for them.

Every apothecary should know the character and quality of the preparations (especially galenical) he is dispensing, and to know this correctly, he should make them himself, using every care and attention in examining the crude material as to its quality, freeness from adulteration, or any impurity, etc.

You will bear with me in the statement, that our country is stocked with a large proportion of tinctures and fluid extracts made on a large scale in large manufacturing establishments; many of these are perfectly reliable and fully represent the activities of the drug in the standard strength required by our officinal formulas, yet there are many others as inferior as these are reliable.

How are the good and bad to be detected? In most cases only by the reputation of the firm or establishment producing them. Hence the great importance of affording the retail apothecary every inducement to make his own. This is accomplished in a great degree by offering him suitable apparatus by which the operations can be performed with little time and labor.

This report is respectfully submitted, trusting it will accomplish the purpose for which it was intended.

## MORTAR PRACTICE

## A FEW NOTES ON CONTUSION.\*

BY H. T. CUMMINGS, M.D., PORTLAND, MAINE.

ONE of the primary objects of this Association, as defined in the first article of its constitution, is to "improve the practice and art of pharmacy by diffusing scientific knowledge among apothecaries and druggists, . . . and encouraging home production and manufacture in the several departments of the business." It was no doubt the desire and intention of the original founders of this Association to include those who are learning the profession, whatever their stages of progress, whether as just entering upon its arduous duties, or as promoted to the highest post of responsibility next to the employer or proprietor. And it is with a special view to the benefit of this class, whose acquisition of useful knowledge may inure directly to the benefit of those who employ them, that I have selected as the theme of the present paper, "Mortar Practice—A few Notes on Contusion, including the powdering of drugs on a small scale, as adapted to pharmacies of limited means and appliances."

The United States Pharmacopœia gives great prominence to the subject of drug powdering, defining in all its formulas the fineness of the powder required in carrying out the processes and reaching the results aimed at. And this is especially noticeable in the various receipts for tinctures, syrups, and fluid extracts. The range of fineness comprised in these formulas extends from drugs comminuted sufficiently to pass through a sieve of twenty meshes to the linear inch, which is the coarsest powder, and is designated as "*coarse*," to that fine enough to pass a sieve of eighty meshes to the linear inch, which is designated as "*very fine*." An admirable idea, this, for now one knows how to arrive at fine, moderately fine, coarse, moderately coarse, etc., and these terms have no longer

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\* Read by title at the sixth session.

a vague signification, but can be brought to the test of the rule and compasses.

Considerable difference of opinion exists among eminent practical pharmacutists as to the fineness of powders requisite to secure the best results. While Dr. Squibb, of Brooklyn, insists that the finer the powder the more perfect is its exhaustion by appropriate menstrua, as in the case of buchu and cinchona, Mr. Campbell, of Philadelphia, deems the labor of obtaining these fine powders for percolation as thrown away, and regards a powder which will pass a sieve of forty meshes to the inch as sufficiently fine for all practical purposes. But whichever is right, it is clear that no Procrustean rule can be made to cover all cases, the structure and constitution of drugs requiring some difference in treatment for every individual in the *Materia Medica*; and, moreover, that where any considerable expenditure of muscle and nerve-power is required, we shall find comparatively few willing to incur it, as all men naturally shrink from taking their share of the divine prescription, "In the sweat of thy face shalt thou eat bread," regarding it rather as a curse to be shunned than as a blessing in disguise. Nevertheless, in all pharmacies, well regulated or otherwise, more or less of this work has to be done, and the writer believes that in detailing to some extent the results of his experience and observation in this connection, he may benefit some apothecary or his *élèves*.

The apparatus employed in drug powdering on the small scale includes the mortar and pestle, the mortar-block and its supports, and the sieves. Of hand-mills I say nothing, for, although very useful for coarse grinding, my experience with Swift's and Spencer Thomas's mills in the production of fine powder has not been of a nature to encourage me to make further investments or trials in that direction. An hour's labor in turning the flywheel of either of these machines, especially if the set screw is turned well up, is far more exhausting to the system generally, than four hours' labor with a ten-pound pestle. I speak knowingly, for I speak from experience.

The mortar, then, when employed for the contusion of

refractory substances, is almost universally made of iron. There are two forms of this utensil in the market. The bell-shaped mortar has a solid base resting throughout upon the block. The goblet shape has a foot which leaves a portion of the bottom of the mortar unsupported, and apparently ill-calculated to resist a powerful blow from the pestle; yet one of this shape which I have in use has seen pretty hard service, and gives no signs as yet of failing.

The discussion of the relation between the form of a mortar and pestle, and the yield of powder from the drug under comminution, would be an interesting question, but comparative experiments have yet to be instituted to determine the best one. Rather more easily settled is that of its capacity. This should be as great, and the weight of the pestle should be as much as the operator can well manage without undue fatigue or exhaustion. No doubt one would be tired at the end of a two hours' hammering if his pestle did not weigh over a pound, but there is no question that he would be better suited, even at the expense of a little more fatigue, to have something to show as the result of his labor. The writer has used a mortar holding seven quarts, and an eight-pound pestle; and on one occasion a two hours' pounding gave five and a half pounds of buchu powdered fine enough to pass a sieve of forty-one meshes to the linear inch. And I am led to believe that a mortar of the capacity of eight to twelve pints, and a pestle of seven or eight pounds weight, will be the most convenient and effective means of producing powders where the quantities required fall within a pound avoirdupois.

An interesting question has suggested itself to me as to the life of a mortar, that is, the number of blows from the pestle it will endure before taking on the crystalline structure, the formation of a crack which gradually extends around the mortar just above the base, until finally the upper part forming the wall of the mortar is separated from the bottom. This has happened to three mortars which have been in my possession. As to two of them, I had no means of knowing how long they had been in use, or the kind of usage they received; but the third, which was larger than either of the



bout a gallon, was carefully treated, and legitimate use. From a careful count of upon the charges in several operations, relief that it received two hundred and afore breaking.

9 attending this fracture attracted my the great lightness of the base after d, and the superior ease of emptying sted the query whether it would not se mortars with the top removable An objection to this might be urged uted the top might be thrown off out in practice it has been found or a succession of rapid and hard e the top when simply laid upon rted by the hand. Moreover, if part of the mortar and its base ebate, or "rabbet," as mechanics hat there would be little or no ed at the bottom.

hich is by no means of trifling : of conical shape, variously is is far superior to the sheet- perforation in the centre ad- e pestle, which are occasion- le leather, or strong, closely vith good results, one made lasted well for more than ated above, is conical, and r two in width, sewed to are attached to fasten it ar, so much the better. nilar binding should be arge to permit the pas- and is grasped by the striking. Thus made, round the mortar and ; made for a definite

purpose is superior to any makeshift. The uses of this addition are obvious enough, as the confining of dust, or of particles of the substance under the pestle from being projected from the mortar. Its height should be sufficient to allow the operator to raise the pestle as high as ever will be done in ordinary work, and to afford him full scope therein.

The hood, as above described, may be, and perhaps can be better cut out by the pharmacist himself than by an outsider who is unacquainted with the required conditions of the case. A good rule for this is as follows: Measure the circumference of your mortar around the rim. Determine the highest lift you are likely to make of your pestle in ordinary work. With this latter quantity as a radius, you draw a semicircle. Draw a line from the centre of your semicircle to its commencement point, and from that point measure off a distance upon the circumference equal to the circumference of your mortar. In the arc thus obtained take three or more points equidistant from each other and from the extremities, and draw radii from the centre, which will divide the sector of the circles into four or more equal parts, and you have a pattern which will exactly fit your mortar. It is best to measure a little more than the circumference of the mortar, in order to allow for seams in sewing the gores thus obtained together. This pattern might be cut out in one piece, and when the mortar is sufficiently small to admit of it, I know of no objection to its being so done, except one on the score of economy of material. Let us suppose, for instance, that the circumference of our mortar is thirty-four (34) inches, and that in ordinary work with the pestle the highest point to which it will be lifted in any stroke is sixteen (16) inches. We take this sixteen inches as a radius, and draw a semicircle. Upon this semicircle we measure off the thirty-four inches, and two (2) inches additional to allow for seam, and it will be found that less than half the circle is required to

requisites in this part of the apparatus are size and steadiness. The material does not appear to be of so much consequence, for while hard wood is almost always sought, I have had one made from a piece cut from the end of a pine stick which was employed for a ship's mast. — This block is eighteen (18) inches in diameter, and thirty (30) inches high. It has served an excellent purpose, and I do not think it could have been any better had it been of oak or maple. The mortar-block should be of full size to receive the base of any mortar likely to be used upon it, and a good addition is an iron hoop around the top which shall rise above the surface, say half an inch. The hoop should be well secured to the top by being shrunk on, as well as by nails or screws. This will prevent the mortar from working over the edge of the block under the action of the pestle. Most mortar-blocks that I have seen have been left in the rough, but within the last twenty years I have had three made, and all of them have been turned to shapes something like those figured in Mohr, Redwood, and Procter's Pharmacy, and they have been rather an ornamental part of the furniture of the "back shop."

The situation of this part of the apparatus is not at all a matter of indifference. It should have a good strong light upon it by day or night. Its position is likely to be permanent if used according to the directions of the Pharmacopœia, that is in furnishing powders for percolation, and nothing is more discouraging than working in a dusky, ill-lighted corner, where it is impossible to see what one is doing; where one works at random, knowing nothing whether he makes a hit or miss, unless he scores upon his fingers; when the work may be thrown aside in disgust with that kind of counting. A good light is quite as necessary in the simple operation of pounding as in any other pharmaceutical manipulation whatever.

Having secured a good light for your mortar, the next thing is to see that its foundation rests upon the earth, and that it is not supported by the floor of the shop. There are two disadvantages in the latter form of support, of which the

first and most obvious is the jarring and derangement of the goods and furniture of the shop, and even considerable breakage and other damage may be caused by it; the second is the loss of power, or rather of effect, by the yielding of the floor to every blow. If the pharmacist possesses a well-lighted cellar with a cemented floor, he cannot have a better place for his mortar-block. If he has not this convenience, let him lay a broad flat stone in the earth at the bottom of his cellar, as level as possible, then upon this set a stick of timber at least six inches square, and long enough to come fully up to the surface of the floor of his shop, and upon this set his mortar-block. A pin or bolt about a foot long set for half its length in the supporting timber, and half in the axis of the block, will serve to keep the latter in place while powdering is going on. And thus arranged all is steady, no trouble to goods or furniture, and every thwack of the pestle tells upon the drug under comminution with full effect.

We turn now to the sieves. These are of various forms and sizes and kinds, round, oval, and rectangular. Some are open at top and bottom, and the substance to be sifted is tossed into them, and the resulting powder received upon a sheet of paper. Some have box-covers to top and bottom, and the material inclosed is sifted without loss or dust. The best of all, to my mind, are those rectangular sieves which are inclosed in a tight box, and operated from without either by the hand or by means of a crank. The sifting medium may consist of horsehair, bolting-cloth, brass wire-cloth, or iron wire, and all these different materials are adapted to special uses, some being better for one and some for another substance. When only one set of sieves can be afforded, I regard brass wire as far the preferable material from its cleanliness, durability, and power to resist oxidation. This may be had in pieces to suit, of mesh varying from ten to one hundred to the linear inch.

The size of the rectangular sieves above described, should be adapted to the requirements of the pharmacist's business. For pharmacies of limited means and business, my own experience would suggest nine (9) inches by fourteen (14), and four

(4) inches in depth, as the size best adapted for quantities varying from one (1) to thirty-two (32) ounces of material to be sifted. They might indeed be much smaller, but occasions will often occur in practice when a smaller size would seriously cramp the operator's action, and cause great loss of time. To avoid the necessity of having a separate box for each size of mesh, I have adopted the plan of a light iron frame to which strips of wood properly "mitred" are screwed; to these strips the brass wire-cloth is tacked, and the whole is then attached to the box by screws. This enables me, by drawing a few screws, to change the mesh of my sieve from coarser to finer, or *vice versâ*, as may be desired. In my apparatus the sieve is hung upon a stout iron wire bent twice at right angles, and the ends are bent into hooks which are let into notches cut into the upper edges of the inclosing box, so that the wire keeps its place while the sieve is shaken to and fro while swinging upon it. A handle passes through the front of the box by which it is operated. I have found a good addition to be a set of buffers made of one-half inch rubber packing three-quarters of an inch in length, let into the two ends of the sieve, which breaks the force and dulls the noise when the sieve strikes either end of the box while working. The sieve is entirely free, so that it can be lifted out from the box almost as easily as from a table. By this apparatus the work of sifting drugs, which evolve much dust, is carried on with comparative freedom from annoyance.

The apparatus necessary to produce the best results in endeavoring to obtain powders of any given degree of fineness has been thus minutely described, because the writer believes that the idea never enters into the heads of a large number of pharmacists that anything besides a mortar and pestle, or a drug-mill, is needed for pulverizing drugs, and that they have no conception of the process required in conducting this operation. Some pharmacists furnish only the mortar and pestle, others may add the mortar-block, but the sieves are invisible, and a dirty towel is made to do duty as a hood to catch stray particles projected from the mortar. The

writer has seen an apothecary's boy seated on the floor with the mortar on the floor between his legs, which stretched out either side of it like a huge pair of tongs, hammering away with what effect might be anticipated from such an awkward position. Since attention has been attracted to the subject of powdering drugs by the discussion of percolation, it has been believed that it would be practically useful to collect the description of the apparatus best fitted to fulfil the requirements of the United States Pharmacopœia in this respect. The cost of all the articles desired would not exceed, if it would equal, that of a first-rate hand drug-mill; and with this apparatus a finer powder can be obtained with less exhaustion of the vital powers, than with the best hand drug-mill ever offered in the market.

The drying of drugs by carefully managed stove or steam heat is indispensable. Air-dried drugs, as they ordinarily occur in the market, upon being exposed to dry heat, part with from 5 to 15 per cent., and even more, of moisture. Gum arabic has, in the hands of the writer, lost 10 per cent.; Rochelle salts uniformly average a loss of 18 per cent. ;\* crude soft opium 20 per cent. But the cardinal point to be observed is that if success in pulverizing the majority of drugs is expected they must be thoroughly dried. A description of the best means for effecting this is left for another occasion; but air-dried drugs, after yielding a little powder, will clog the sieves, and cake under the pestle.

Strange as it may seem the part in which inexperienced operators fail is working the pestle. The action is simple enough, merely lifting the pestle and striking it down upon the substance in the mortar. But there is a difference, striking in more senses than one, between the listless, ill-aimed, perfunctory pounding of an unwilling, inexperienced neophyte, and the rapid, telling blows given by an expert operator bound to get to the end of his task quickly, wisely,

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\* Rochelle salt contains 25.5 per cent. water of crystallization, 17.5 to 19 of which are given off at the heat of a water-bath, the remainder at a temperature of 180° C. (266° F.).—EDITOR.

perhaps, don't care "whether school progress is slow accordingly; the mind to what he is about, and makes him able to appreciate. Now my experience convinces me that this operation, simple as it looks, that we do, requires attention in detail. And this attention, momentary as it is, like the blow of the pestle, lends an emphasis which would surprise any one who has not noticed the fact. And the easiest way to the blows is by *counting* them. In the same order which the practice of the mortar ends at the termination of each operation, at every one or two hundred, or three hundred, the work somewhat analogous to a boat.

For striking a thousand blows with the mortar, many pauses for taking breath or for the mortar, and this, in most instances, is necessary for executing the operation in the quantities assigned. For example, 8 pounds of poppy capsules was a mortar holding about 10 pounds. The sieve employed was No. 20. Every five hundred blows. For the seeds and envelopes they weighed 10 half ounces, avoirdupois. When completed the powdering, 10 and 2½ ounces of gruffs, capsules had previously been set, the operation would be as well as facilitated, requiring that ten thousand powdering-time, was only repeated a year after-wards; it is noticeable that the texture, which caused the capsules to be brittle, and that No. 20

was found practically to be fine enough for their percolation. Six pounds of buchu were also pulverized with the same apparatus, sieve No. 40 being used. Sifted at each four hundred blows, time two hours, 4000 blows delivered; product, powder,  $5\frac{1}{2}$  pounds; gruffs,  $3\frac{1}{2}$  ounces; loss  $\frac{1}{4}$  pound. In this last case the writer had the assistance of an employé, who, encouraged by his example, handled the pestle with skill and effect as he counted his blows.

Among the refractory substances which yield slowly and reluctantly to the action of the pestle, are colchicum seeds and sago. With the former the writer's experience has been too limited to be able to offer anything of interest; with the latter, however, something positive can be said. Having occasion for some finely powdered sago, and being unable to purchase it, its pulverization was undertaken. It was supposed, in the absence of all previous experience with it, that it would yield readily to the pestle, and a charge being put into the mortar a thousand blows, well laid on with the pestle, gave only  $1\frac{1}{2}$  ounces of powder No. 100. This was both discouraging and provoking; but the residue was put into the drying-closet, and kept for two days, when it was tried again. One thousand blows yielded  $5\frac{1}{2}$  ounces; six thousand additional blows gave 19 ounces. So that from eight thousand blows of the pestle a little less than 26 ounces were obtained. On another occasion twelve thousand blows of the pestle gave 4 pounds of powder No. 100. This was effected by having the sago hot from the drying-closet, and both pestle and mortar so hot that they could not be handled without gloves.

When drugs are thoroughly dried in the closet, upon concussion in the mortar they are apt to evolve much dust, sometimes bland, sometimes irritating, and some acrid and poisonous. Examples may be found in gum arabic, which is bland; castile soap and opium, the dust of which is extremely irritating to the nostrils; aloes, columbo, and rhubarb, which are bitter; and bloodroot and aconite, which are acrid and poisonous. It is for such as the latter that the hood or cap over the mortar, and the close sifting-box, are specially useful. Without these parts of the apparatus it is somewhat



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or attracting so much attention at the present time as percolation, and none so difficult to the student of pharmacy to comprehend. There are several points in regard to the process of percolation worthy of argument, and which can only be settled by careful observation and continual practice. Percolation, or filtration by displacement, so called by the pharmaceutical world, is virtually "lixiviation," which is the exhaustion of vegetable substances of their soluble constituents by means of a liquid or menstruum capable of holding them in solution. The first and most important step is the selection of a suitable vessel, which should be of a gradually tapering descent till it forms a perfect cone. Funnel's are, perhaps, the most available for ordinary use in all drug stores. Percolators of tin answer a good purpose, yet are liable to many serious objections. I have within the last three months been using almost continually a glass percolator designed and patented by Mr. L. Dursse, of Baltimore, and I must freely confess that it is, without exception, the most simple, economical, and perfect instrument of its kind. He has constructed it in proper symmetrical proportions with an accurately fitting ground-glass stopper to prevent evaporation of menstruum, a desideratum when long maceration is necessary. Glass is, without doubt, the best material for the construction of percolators. The second important step towards a successful result is the proper degree of fineness of powder. A great diversity of opinion exists in reference to this point; in my judgment and experience, a powder that has been passed through a No. 40 wire sieve is sufficiently fine for any drug, and in the majority of most substances a powder of No. 20 will give a thorough and complete exhaustion. My theory is that a No. 40 powder represents a perfect breaking up of the cellular structure, leaving sufficient space between the particles, when packed, for the menstruum to permeate and dissolve out the active soluble matter, when in the case of very fine powders, where the mass becomes so very compact when moistened, as to prevent a proper saturation of all the particles, they are liable to contract or shrink, and the menstruum to pass down the crevices formed, thereby only

exhausting certain portions of the drug. The third step is the proper menstruum to be used. In a great many instances authorities have, in providing a menstruum, sought the isolating, as it were, of the more prominent characteristic principles, and discarding the active soluble extractive matter, which with the more active principles combined, would give a better representation of the drug or drugs in the resulting preparation. The fourth step is the moistening or dampening of the materials previous to packing. This should be done in a large vessel, and from two to four ounces of the menstruum mixed with each pound of materials and thoroughly incorporated with the hands through the whole mass; and here, I would state arises the difficulty with very fine powders. When the liquid to moisten is poured over a fine powder, which is, in fact, a dust, the particles will agglutinate and form small pellets, which involves a second rubbing through the sieve, and does not give a very fine powder as the result, yet gives the operator an unnecessary waste of time and labor. The fifth step is the packing of the materials in the percolator, which should be done by first placing the diaphragm in position, which may be of sponge, or cotton, or lint, or the usual one of a piece of perforated tin or wood, then carefully placing the whole of the materials in the percolator, and when carefully regulated, an equal pressure may be exerted upon the whole mass, either with the hand or a block of wood of the same diameter as the percolator, said pressure to be regulated as in the judgment of the operator the drugs will require tight packing or otherwise. The packing in layers as advocated by some pharmacists, is liable to the objection of being unequally packed, as it is almost impossible to exert the same pressure upon each layer of the materials. The sixth and last step, though not the least important, is the pouring on of the remainder of the menstruum, and allowing it to permeate the whole mass, which may be seen if the glass percolator or funnel is used, and when it begins to drop, either place a cork in the neck of the percolator, or, as in the *Dursse* instrument, which is an improvement, tightly screw down the glass stopper and let it remain four days; on the fifth day

remove the cork, or loosen the stopper, and allow the percolation to proceed slowly but regularly; and here, I would state, is another great advantage in using the *Dursse* percolator, viz., by loosening the stopper gradually, a regular flow of the liquid may be obtained without any loss of the volatile constituents of either the menstruum or materials being percolated.

PHILADELPHIA, September, 1875.

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## THE PHARMACEUTICAL PREPARATIONS OF PHYSOSTIGMA.\*

BY GEORGE W. KENNEDY, POTTSVILLE, PA.

QUERY 47.—An essay on Calabar Bean, giving the readiest method of obtaining the various pharmaceutical preparations and isolating its active principle.

IN response to the above query, the writer would report the following as being as easy and simple a process for the various pharmaceutical preparations of *Physostigma venenosum*, in his opinion, as can be offered for your acceptance. I experimented with various menstrua of alcoholic strength, and none of them gave the satisfaction as the one I herewith present for your consideration. Most of the preparations of Calabar bean that have heretofore been manufactured were made of strong alcohol, with very few exceptions. Our deceased co-laborer, Prof. William Procter, recommended a menstruum composed of seven fluid ounces of alcohol, and three fluid ounces of water, and one troy ounce of bean, which makes a half pint of tincture when the preparation is completed.

I do not favor the use of strong alcoholic preparations, so long as a weaker alcohol will answer the same purpose. *Physostigmina* is the active principle of the bean, a certain per cent.

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\* Read at the fifth session.

in water ; and, knowing this to be the  
 commend a menstruum composed of alco-  
 different preparations, and used in the  
 3) parts alcohol and one (1) part water ;  
 so tenacious, I would also recommend a  
 of the drug before proceeding with  
 ise the exhaustion will be imperfect.  
 all the preparations of the bean that  
 solid extract, fluid extract, tincture,  
 alabarized gelatin, besides the alka-  
 nia.

*m Physostigmatis.*

ately fine powder, .	. 12 troy ounces.
. . . . .	. 9 fluid ounces.
. . . . .	. 8 " "
. . . . .	. 1 " "

glycerin together ; moisten the  
 of the mixture, pack in a coni-  
 the surface of the powder with  
 alance of the mixture, cork the  
 nd set aside in a moderately  
 which remove the cork, and  
 th a menstruum composed of  
 t water, until completely ex-  
 nd evaporate in a porcelain  
 to the proper consistence.  
 keep the extract in a soft  
 nvenient for manipulation,  
 the component parts of a

*is Fluidum.*

nder, .	. 16 troy ounces.
. . . . .	. 12 fluid ounces.
. . . . .	. 4 " "

l ounces of the above  
 percolator, after which

cover the surface of the powder with a disk of paper, and pour upon it a sufficient quantity of the menstruum until the liquid begins to drop from the percolator; then close the lower aperture with a cork, and cover closely, and set aside in a moderately warm place for four days, after which the cork should be removed, and more menstruum added until thoroughly exhausted, the first twelve ounces being reserved, and the balance to be evaporated to four fluid ounces, and mixed with the reserved portion, and after standing a few days should be filtered through paper. This preparation is but little used in our locality, and I believe but little used anywhere else, but makes an excellent preparation to prepare calabarized paper or calabarized gelatin.

### *Tinctura Physostigmatis.*

Take of Calabar bean in moderately fine powder, . . .	4 troy ounces.
Alcohol (95 per cent.), . . . . .	24 fluid ounces.
Water (distilled), . . . . .	8 " "

Mix the alcohol and water; moisten the powder with two fluid ounces of the menstruum; pack in a conical glass percolator, and cover the surface of the powder with a disk of paper, and pour six fluid ounces of the above menstruum on it; cork, and cover the percolator closely, and allow it to remain in this condition four days, after which remove the cork, and proceed with the percolation and with the same menstruum until two pints of tincture are obtained, which will be found sufficient to thoroughly exhaust the bean. Some of the formulas which have been published for making this preparation contain a much larger proportion of the bean. My object in making it four troy ounces to the quart of tincture is so that it will conform in the proportion of solid material with most other tinctures. •

### *Calabarized Paper.*

This is readily prepared by taking paper deprived of its size—thin letter-paper, not ruled, is the best—and the size got rid of by boiling in water and drying. By dipping the paper

in the fluid extract, of which I have given you a formula three or four times, and dried after each immersion, will impregnate the paper with a sufficient amount of the extract to perform the necessary service when applied to the eye. This plan of obtaining the effects of Calabar bean is objectionable, by being inconvenient, as it necessitates the removal of the paper subsequently. Calabarized gelatin is a much more preferable preparation, and would recommend the following formula:

*Calabarized Gelatin.*

Gelatin, . . . . .	80 grains.
Water (distilled), . . . . .	2 fluid ounces.
Glycerin (Bower's), . . . . .	gtt. xx.
Fluid extract physostigma, . . . . .	ꝑc.

Make a solution of the gelatin in the water and glycerin, and, while the solution is still warm, filter through paper in a warm funnel; add the fluid extract, and evaporate. When it is evaporated to the proper consistence, spread on a glass plate or marble slab, with edges slightly raised, and with perfectly even surface, and place another glass plate or slab on top, which will keep it even and smooth; when it is hard enough, remove the plates, and divide into one hundred equal squares of about an eighth of an inch square, or as some might perhaps prefer, in circular form. The object here of the glycerin is to prevent its brittleness. The slabs should be slightly greased and warm, so as to prevent the shrinking and sticking of the gelatin. One of these small disks, containing about one grain of the bean, placed in the eye, will be immediately dissolved by the secretions, and the remedial agent absorbed, and the effects of the bean produced.

*Physostigmia*

I obtained by treating the extract as prepared according to the formula given, with a small quantity of dilute sulphuric acid, and diluting the mixture with water, filtering, and supersaturating with ammonium carbonate. The whole is now shaken with strong ether, and the ethereal solution which

contains the alkaloid is separated after standing, which yields on evaporation the physostigma in an impure condition, being contaminated with a red foreign matter, which obstinately adheres to it, and requires repeated solution in ether and crystallization to remove all the impurities.

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## ON SPIRITUS AMMONIÆ AROMATICUS.\*

BY WILLIAM M'INTYRE, PHILADELPHIA.

QUERY 16.—What are the causes of the difficulties (precipitation) which some pharmacists complain of in the preparation of Spiritus Ammoniae Aromaticus, U. S. P. ?

EXPERIMENTS were made with the view of observing the results, from the use of materials in the probable forms found in commerce, the proportions of the officinal formula being the basis.

Solutions were made with translucent carbonate of ammonium, alcohol, and 5, 10, 20, and 26 per cent. water of ammonia respectively.

With one-half translucent and one-half opaque carbonate of ammonium, and with bicarbonate of ammonium in the same manner.

Parallel experiments, using a stronger alcohol (commercial alcohol of 92 per cent.) were likewise made.

Under whatever circumstances officinal alcohol was used, clear solutions finally resulted, and in only one instance did precipitation occur at the moment of mixing the ingredients, namely, that in which bicarbonate of ammonium and stronger water of ammonia entered. This precipitate, however, redissolved by agitation.

With commercial alcohol, in every case a precipitate was thrown down. It was redissolved with translucent carbonate of ammonium, when water of ammonia of 10, 20, or 26 per cent. had been employed.

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\* Read at the fifth session.



With one-half translucent and one-half opaque, and with bicarbonate of ammonium, when water of ammonia of 20 and 26 per cent. had been employed.

Remaining as a crystalline precipitate in the case of translucent carbonate of ammonium and water of ammonia of 5 per cent.

One-half translucent and one-half opaque, and also with bicarbonate of ammonium and water of ammonia of 5 and 10 per cent.

When alcohol of the proper strength is employed no precipitation will occur, regardless of the kind of water of ammonia or carbonate of ammonium used in conjunction therewith.

When inadvertently the directions are deviated from and commercial alcohol taken, the slight increase in alcoholic strength is sufficient to throw out of solution bicarbonate of ammonium; it is here where the trouble is most frequently met with, a low temperature increasing the difficulty.

By agitation or a slight increase of temperature, this quickly redissolves, with the seeming advantage of a more complete solution of the aromatic oils than in the officinal spirit; but after a time, if allowed to remain at rest in a cool place, large crystals will be deposited.

In answer to the query, stronger alcohol being used in place of officinal alcohol, is the cause of the precipitation complained of, and whenever either an ammonia water, weaker than the officinal, or an effloresced carbonate of ammonium is used along with it, the precipitate formed will not redissolve, but remain permanently.

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## ON SYRUPS PREPARED BY PERCOLATION.\*

BY CLAY W. HOLMES.

In this age of progression and competition it is necessary to make some change in the manufacture of pharmaceutical preparations to satisfy the demands of elegance. In this

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\* Read by title at the sixth session.

article a few thoughts and results are offered, more with a view of exciting discussion among the more experienced than of presenting any ideas claimed as absolutely new or original. The subject is one which seems to me to have been neglected. Many, if not all, pharmacists have experienced the dissatisfaction of having sour and fermented syrups returned, especially during the summer months, the idea of the patient being that they were not properly prepared. This is particularly true of syrups of ipecac and scillæ comp. No doubt many have prepared both from the fluid extracts at the time of dispensing to avoid fermentation in a stock-bottle. This at least has been my method for a number of years. To avoid the trouble and dissatisfaction consequent to this practice, I have endeavored to devise a process which, without violating the legal formula, would accomplish the end sought. The chance remark of a brother pharmacist at our last meeting suggesting percolation, gave me the idea upon which I have worked. The Pharmacopœia process with some of the syrups presents no difficulty; with *syrupus ipecacuanhæ* and *scillæ comp.* it is not satisfactory, therefore my attention has been directed more especially to them. Coarsely granulated sugar has been employed in all of my experiments. Percolation has been conducted in conical glass funnels, the apex obstructed by a small piece of fine sponge. No change was made in the prescribed formula for *syr. simplex*, *scillæ*, *tolu*, *pruni virg.*, or *zingiberis*, except the substitution of percolation for heat. The resulting syrup in each instance was clear, bright, and denser than when made by heat. Samples of each at the end of six months presented no change.

The following formula was employed for syrup of ipecac:

R. Extract. fluid. ipecac.,	.	.	.	.	℥vii.
Spts. vini rec.,	.	.	.	.	℥iv.
Aquæ,	.	.	.	.	Oij + ℥iv.
Sacch. alb. gran.,	.	.	.	.	7 lbs. av.

Mix the alcohol with the fluid extract, and add the water. Pour the sugar (without packing) into a conical glass funnel, and proceed as in ordinary percolation, returning sufficient of

the liquid to dissolve the sugar. The fluid extract employed was made from a formula published in the American Journal of Pharmacy, vol. 45, page 481.

In the preparation of syrupus scillæ comp. the first step was to prepare a fluid extract based upon the formula for the syrups of such strength that one fluid ounce would represent six fluid ounces of the officinal syrup. With this as a base, the following was the process employed :

R. Ext. fluid. scillæ comp., . . . . .	f℥xss.
Sp. vin. rect., . . . . .	f℥ij.
Aquæ, . . . . .	f℥xxvj.
Sacch. alb. gran., . . . . .	oz. lvj av.

Proceed as in syrup ipecac. The result in each instance was a brilliant syrup, which, compared with the officinal syrup, presented decided advantages. I have placed on the table for examination two samples of each syrup. The syrup of ipecac was made March 1st. The syrupus scillæ comp. June 1st. They have been subjected to the most unfavorable circumstances to test their keeping qualities. You will find them, upon close inspection, to be in a perfect state of preservation, and as desirable as on the day of preparation. This seems to me a sufficient argument in favor of the process.

Fearing that the therapeutic effect of these syrups might be lessened by this mode of preparation, I took the trouble to obtain reports on the effect produced in a sufficient number of cases to satisfy me that no objection could be raised on that ground. Feeling thus assured, I do not hesitate to present these remarks on the process of cold percolation, and ask a trial for it, with reports upon its merits. The question of labor may arise in your minds, but I can assure you when the grand total is figured up the balance will be in favor of percolation.

WILKESBARRE, PA., September 1st, 1875.

## ON CHLORODYNE.\*

BY JOHN F. HANCOCK, BALTIMORE.

QUERY 24.—Chlorodyne is frequently prescribed by physicians, and seems to be a useful preparation in many cases. Give a formula for it which would be suitable for introduction in the United States Pharmacopœia.

THE subject under consideration has engendered much discussion within the past few years, and though several analyses have been made by different chemists the results have not been sufficiently satisfactory to reconcile the adoption of a formula for general use.

The dictionaries fail to give the word, and its etymology is generally unknown. J. T. Davenport, in his advertisement of "chlorodyne," said to have been invented by one Dr. J. Collis Browne, informs us that the word is a fanciful name coined by Dr. Browne to especially designate the preparation which he invented. We find the word in the American Cyclopædia, just published by the Messrs. Appletons, in which it is defined to be "a name given to several secret preparations," the most important ingredients of which are chloroform, morphia, cannabis indica, capsicum, and hydrocyanic acid. We find several preparations in the English market known as "chlorodyne;" generally each is claimed to be original, though essentially different in composition. An important lawsuit, between the proprietors of the respective preparations known as Dr. J. Collis Browne's and Freeman's "chlorodyne," if our memory serves us correctly, decided Dr. Browne's to be the original, and that the name was first applied to his preparation. We have been informed that in this country, also, several pharmacists manufacture preparations known as "chlorodyne," which we must condemn as wrong in principle unless the preparations represent the original.

So far as the writer is aware only one English chlorodyne is sold in the United States, which is the preparation manufactured by J. T. Davenport, of London, and known as "Dr.

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\* Read at the fifth session.

J. Collis Browne's chlorodyne." This has enjoyed a liberal patronage at the hands of physicians.

At the last meeting of this Association we had the honor of presenting a formula for liquor chloroform compound, copied from Mr. Peter Squire's Companion to the British Pharmacopœia, and is also published in the last Proceedings in the report on unofficinal formulas. Mr. Squire states that it was represented to him as the formula for the popular remedy known as "chlorodyne," which he publishes so that physicians, when ordering the preparation, may know its composition. The "liquor chloroform compound" closely resembles, in appearance, taste, and medical properties, the chlorodyne of Dr. Browne as it first appeared in the market. We have dispensed the article made by Mr. Squire's formula for several years, and those physicians who have used it as a substitute for the chlorodyne express entire satisfaction with its results. At the present time it has almost displaced chlorodyne from our trade.

That chlorodyne has merit as a medicinal agent we do not deny, but experience convinces us that the compound liquor of chloroform is equally efficacious, and should be substituted for it in medical practice. The facts that its composition is known, and that it can be supplied at a reasonable price, are arguments in its favor, apart from the professional impropriety of prescribing and dispensing *nostrums* in prescriptions.

We would recommend to the Association the adoption of Mr. Squire's formula, and to the Pharmacopœia committee, a careful consideration of the same, feeling assured that its introduction into the United States Pharmacopœia would gratify physicians and pharmacists. In that event, however, it would be well to consider the question of *name*, and for the sake of consistency the *definite name*.

*Liquor chloroformi compositus* should be adopted, and the meaningless name "chlorodyne" only referred to as a *nostrum* of similar properties. The Association should be careful to observe a correct nomenclature in dealing with formulas, and

not attempt to compete with *tricky traders* in the use of meaningless names, or those that misrepresent the composition of preparations.

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## ALCOHOL AND MUCILAGE OF ACACIA.\*

BY M. S. BIDWELL, ELMIRA, N. Y.

MUCILAGE of acacia is often used in mixtures as a demulcent, either to sheath irritated mucous surfaces, as in cough mixtures, or to mask the acidity of other ingredients, as in diuretics. It is also often used to hold in suspension insoluble substances. Now it ought to be generally understood that mucilage and alcohol are incompatible; yet from thoughtlessness or ignorance of this fact they are not infrequently prescribed together, causing trouble to the dispenser, and disappointment to the patient and the prescriber. It must be understood that whenever *alcohol* is mentioned in this paper, all strong alcoholic liquids are included. This incompatible combination is seldom met in cough mixtures, as strong alcohol is not often used in these in sufficient quantity to make trouble. It is most common in diuretic mixtures, in which mucilage of acacia is often found directed in connection with fluid extracts of buchu and cubeb, and spirits of nitre, all of which are, or should be, of the full strength of officinal alcohol, and in the case of cubeb and spirits of nitre, of "stronger alcohol."

Unfortunately, as we know by experience, the spirits of nitre is seldom found of this strength in the average trade, being largely watered by unscrupulous jobbers. A specimen in my possession contains about three-fourths of water, as indicated by the specific gravity.

Having suffered from this annoyance, the writer was led to experiment a little, with a view to ascertain the limit of this incompatibility, and, if possible, to find some way to avoid

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\* Read by title at the sixth session.

its unpleasant effects. The results reached, such as they were, are briefly as follows:

I. When mucilage and alcohol of 95 per cent. are mixed in any proportions, a tough curdy precipitate is formed, entirely destroying the usefulness of the mucilage, if the alcohol is in sufficient quantity.

This action is a little modified by circumstances, *e. g.*, II. Mucilage and fluid extract of buchu do not form the tough precipitate so quickly, their union seeming to be hindered by the oil or resin of the buchu.

III. When the mixture is made gradually, with energetic trituration in a mortar, the "curd" is so broken up that it may be got into a bottle, though if left undisturbed it very soon cakes together so that it is difficult to get it out again.

IV. On the addition of water, equal in bulk to the mucilage and alcohol used, this precipitate is redissolved.

V. Two parts of alcohol and one of water (*i. e.*, alcohol of 65 per cent.) precipitates the mucilage, though the curd is not at first as tough as with strong alcohol.

VI. Mucilage and officinal dilute alcohol (or about 45 per cent.) mix without change.

VII. Diluting the mucilage instead of the alcohol does not prevent precipitation.

VIII. Strong alcohol and syrup of acacia mix with some little turbidity, but little or no curdy precipitate. After a time crystals of sugar are deposited.

From these results the following practical suggestions are deduced. First, to the prescriber:

I. Do not prescribe mucilage of acacia in connection with alcoholic fluids, unless there is some other diluent at least equal in bulk to the alcohol employed.

II. When a demulcent or suspensor is desired in connection with strong alcohol, syrup of acacia is suggested as a substitute for mucilage.

To the dispenser:

III. When mucilage, alcohol, and water are prescribed together, dilute the alcohol first, adding the mucilage last.

IV. When mucilage and alcohol are prescribed without any

diluent, mix them in the mortar. This will probably enable you to get the mixture into the bottle, though the consumer may have trouble to get it out again.

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## **"CACHET DE PAIN,"**

**OR THE NEW METHOD OF ADMINISTERING NAUSEOUS OR  
DISAGREEABLE POWDERS.\***

**BY JOSEPH P. REMINGTON.**

PHARMACY has from time to time been greatly enriched through the efforts of the French pharmaciens, and one of the most successful efforts of late has been by the introduction of the wafer seal, or "Cachet de Pain." Mr. G. A. Zwick, of Covington, has taken the trouble to import from France the apparatus for preparing the wafer seals, and his translation from the Report of the Academy of Medicine of Paris, would, no doubt be of interest. M. Pidoux, in the name of a commission composed of MM. Mialhe, Gobley, and Pidoux, submitted the following:

Our honorable colleague, M. Bussy, has placed before you a note from Mons. Limousin explaining a new mode of administering and preserving medicines prescribed in the form of powders.

Practitioners who prescribe medicines in the form of powders, and, above all, patients who have to take them, realize how difficult and disagreeable, sometimes almost impossible, is the administration thereof.

Medicines in the form of pills dry out and harden, often requiring a considerable number to obtain the desired result, and the gastric juice frequently rebels at the task of dissolving them. Medicines dissolved, communicate their taste, pungent, bitter, styptic, nauseous, or otherwise intolerable, and suspended, they have those well-known inconveniences of adhering to the glass, spoon, mouth, and palate, irritating

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\* Read at the sixth session.



the throat, often producing a cough that ejects the medicine violently through the mouth or nose.

To obviate these difficulties, wafers have been used to envelop or wrap up the medicine in. This is not effected, however, without considerable trouble, and then imperfectly, and at the risk of scattering or losing part of the dose. To overcome these objections M. Limousin has applied himself, and it appears to the committee, with success.

By his method the patient receives, all ready prepared for taking, a sort of lentil-shaped seal or flattened capsule containing one dose of the powder.

These flattened envelopes are formed by firmly cementing two concave disks together at their edges so perfectly as not to lose a particle of the substance to be administered; this is done in a moment, facilitated by the aid of a press invented by Mons. Limousin for the purpose; the concave parts thus form a doubly convex lentil-shaped seal or capsule, which is made of a similar substance that powder wafers are made of, not so brittle, however. The smallest is the size of a nickel five-cent piece, the second the size of a silver quarter of a dollar, and the largest, the size of a large copper cent. The last, and largest size, will or can contain twenty to thirty grains of a substance of the gravity of powdered rhubarb or aloes.

When using these wafers or capsules, it is not necessary to fold the powder in paper; they are simply put into a box in the same manner as pills, without any consperging powder, however, and with a little practice this process does not require any more time than the ordinary way of folding the powder up in paper.

To take these capsules, you place them in a spoon with a little water; the capsule then softens, and becomes pliable without breaking, and a child even can swallow them without difficulty.

This mode of administration recommends itself especially for bitter and nauseous medicines, such as quinine, aloes, rhubarb, ipecac, etc., but it is also of advantage for substances like bromide of potassium, and again for heavy articles

like calomel, which by the ordinary way of giving powders, are left in the spoon or glass.

The report closes by stating that the chairman of the committee has seen the capsules administered and taken them himself, and he and his patients join in praising this agreeable and practical method of giving distasteful medicines.

This report of the committee of the French Academy does not speak too highly of the convenience of these little "cachets" as a means of administering medicaments, and one advantage not spoken of particularly is, that they very rapidly disintegrate on reaching the stomach and thus liberate the medicine *as a powder* in the most simple manner. So that many prescriptions which the physician has been compelled to give in the form of a pill (on account of the nauseous nature of the powder) can now be elegantly administered by this means. The disadvantage of the pill thus being avoided, that of insolubility, and on account of the greater extent of surface possessed by the powder, the effect of the medicine is more quickly perceived by the patient.

This apparatus promises to be the "deliverer" which has been looked for so anxiously by many pharmacists, to relieve them from the necessity of keeping so many varieties and makes of coated pills in stock, for now the apothecary with the aid of an inexpensive apparatus, can prepare on call, either in large or small quantities, a more efficient means of pleasantly administering disagreeable substances.

PHILADELPHIA, Eighth month, 21st, 1875.

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## PHARMACEUTICAL PREPARATIONS OF PHOSPHORUS.\*

BY GEORGE W. SLOAN, OF INDIANAPOLIS. .

QUERY 7.—Phosphorated resin, by A. W. Gerrard, has been introduced as an eligible mode of administering phosphorus in a pilular form; can an agreeable emulsion be prepared from it or a desirable liquid preparation?

HAVING accepted the above query, I prepared the phos-

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\* Read at the fourth session.

phorette resin, following the process of Dr. A. W. Gerrard as published in the American Journal of Pharmacy, for January, 1874. In reply to the query, I would say that glyconin serves as a very nice vehicle for the resin, and holds it thoroughly suspended. Finding some difficulty in suspending the large amount of resin with gum, in the form of an emulsion, I endeavored to make a stronger form of phosphoretted resin; and, borrowing the idea from one whose name I do not remember, I adopted the following: Take a Wedgwood mortar of say eight ounces capacity; put into it one ounce of water; set upon a sand-bath; weigh ten (10) grains phosphorus, and drop into the water; in a few minutes it will have fused; weigh ninety (90) grains clear resin, drop it also into the water, and, when it has become sufficiently softened, incorporate the fused phosphorus with it, using a warm pestle, and being careful to keep the mass under the water. When thoroughly incorporated, or when the resin has taken up the phosphorus, remove from the water with a spatula, and lay upon a tile, or something which the soft resin will not adhere to; in a moment it will have become hard and brittle, and may be rubbed into a powder, although my preference is to keep it in pieces in a close-stoppered bottle. This contains ten per cent. of phosphorus, and may be triturated into a powder with sugar of milk, into an emulsion with sugar and gum, and readily forms pills with the various extracts and other medicines, and contains such a small proportion of resin as to greatly remove the objection to the use of the resin, viz., its insolubility. This mode of preparation has for its recommendation the fact of its safety, and may with ordinary care be conducted by any pharmacist without endangering either his person or property.

NOTE ON PHOSPHORUS PILLS,  
MADE WITH CACAO BUTTER AND CASTILE SOAP.\*

BY WILLIAM H. WALLING, PHILADELPHIA, PA.†

IN presenting these pills, I desire to call attention to cacao butter as a solvent for phosphorus. I believe it will dissolve two per cent. of its weight of that substance without supersaturation, but this may be disproved by further examination. That it is superior to phosphoretted resin, wax, spermaceti, or tolu, there can be no doubt.

The formula for the accompanying sample of pills is as follows, manipulation being modified from process in Journal for June, 1875 :

R.—Cacao Butter, . . . . .	200 grains.
Powdered White Castile Soap, . . . . .	100 “
Phosphorus (solid pure),. . . . .	6 “

Melt the butter by means of a water-bath in a wide-mouthed bottle just capable of holding it; cut the phosphorus under water, dry with a linen cloth, and weigh; add to the melted butter, cork tightly, and agitate until it is dissolved, as it will all apparently be taken up. After cooling, transfer it to a larger vial, cork tightly, reheat, and add soap, agitating until it is intimately mixed. After again cooling, divide it into one hundred and eighty pills, containing one-thirtieth of a grain of phosphorus each. Coat with ethereal solution of resin, mucilage, and French chalk.‡

Repeated experiments have proved that the above dose is as large as should be administered; while still less, one-fiftieth or one-sixtieth, furnished good results.

\* Read at the fourth session.

† See Am. Jour. Pharm., June, 1875.

‡ See Am. Jour. Pharm., July, 1874, for French chalk coating.

## NOTE ON HOMEMADE PILLS.\*

BY CLAY W. HOLMES.

It is a deplorable fact that the druggists of the present day are relying too much on the wholesale dealers and manufacturers for their pharmaceutical preparations. This is proved by the vast number who deal exclusively in preparations manufactured by themselves. It is true that skilled labor is required to prepare many of these articles, and much time and labor are consumed; but any pharmacist who loves his vocation will discover a reward sufficient for his labor if he manufactures for himself, not only in the cost of the article, but also in the quality. Proofs are abundant that the quality of many manufactured preparations of the American market is not what it should be. Were each druggist to manufacture for himself, following the standard authority, a different medical history of the remedial effects of many of our leading preparations would be exposed. The satisfaction of being able to furnish preparations which we know from personal manufacture are what they really purport to be, is sufficient compensation for the labor involved.

These remarks are not intended to depreciate the reputation of the few worthy manufacturers whose records stand above reproach.

Deception is very easily masked in pill form, especially when the mass is coated. A few samples of pills coated with gelatin are herewith presented for inspection. The superiority of gelatin coating over sugar is established beyond a doubt. It is practically impossible for the retail pharmacist to sugar-coat pills in such a manner as to compare favorably with those of the market. Gelatin coating is easy of application, and when carefully performed gives a pill equally as desirable and attractive as those of the largest manufacturer. Limited time prevents a description of the process in this article. It will be treated on hereafter.

WILKESBARRE, PA., September 2d, 1875.

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\* Read by title at the sixth session.

## THE READY-MADE PILLS OF OUR DAY.\*

BY JOSEPH P. REMINGTON.

THAT there is a growing prejudice amongst the members of both the medical and pharmaceutical professions, whose aim is "the greatest good to the patient," against ready-made pills of all kinds, be they sugar-coated, gelatin-coated, silver-coated, resin-coated, compressed or lenticular, etc., cannot be denied.

Some go so far as to assert that almost all have proved either worthless or so unreliable in their hands that they will not waste time or run risks by prescribing them, stating as their principal ground of complaint that the insolubility of the coating prevents the pill from becoming sufficiently disintegrated to produce the desired effect.

Others believe that it is because of the poor quality of the ingredients, a lack of care in composition, the hardness of the pill itself, and last and greatest the cupidity of the manufacturers.

Perhaps the greater number prefer to assign no cause, but remain practically convinced that ready-made pills should not be dispensed under any circumstances.

The writer is unwilling to join in the hue and cry against manufacturers *as a class* on account of the statements, which are now very frequent, that they are thought to be entirely devoid of the rare qualification of a tender conscience, and that they consider it their duty to supply the dirtiest aloe at the lowest price, and hide their sins behind the glossiest sugar-coating, that they may reap the highest reward for the "whited sepulchres."

He prefers to take the ground that by far the greatest number of the well-known manufacturing firms are composed of men who are not mere adventurers living but for the moment, but that they are gifted with at least ordinary business foresight, and realize fully that cinchonated quinine,

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\* Read at the third session.

glycyrrhized opium, and ochred rhubarb, must in the end prove a delusion and a snare.

Setting aside this question of quality of *matériel*, as one which generally works its own cure, the writer addressed himself to the query: Can the form of the pill, the character of the coating, or an injury during the coating by heating, interfere with their solubility?

Realizing the fact that a fair absolute test of solubility that would be applicable to all the varied conditions of the fluids of the stomach, whether acid, alkaline, or neutral, would be an impossibility, it was thought best to take temperature, acidity, alkalinity, and digestive power into consideration, and from this range a tolerably fair judgment might be arrived at.

Taking then fair samples of the best pills that the market afforded the following experiments were made:

An examination of the results as tabulated shows that the plain uncoated pill is to be preferred in point of solubility; that next in order the sugar-coated pill comes; then the compressed, and lastly the gelatin-coated.

It was thought advisable to try, along with the comparative tests, the Cachet de Pain \* under the same circumstances, and it will be seen that this method of coating powders and pills is superior to any in point of permitting the medicine to dissolve or digest readily.

The writer confesses to some degree of surprise, however, at the readiness with which the sugar-coating dissolved, for we have been taught to believe of late years that this was the great objection to them, but it will be seen that the coating was off in the quinine pills in three, five, eight, and fifteen minutes, and whatever defect existed in the sugar-coated pill did not come from the coating, but existed in the pill itself.

The gelatin-coating, or more properly *glue*-coating, proved to be a disappointment.

In several cases the coating refused to release the pill for many hours, and in some cases, even after standing, the liquid was not colored.

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\* See another paper, on this subject.

*Table of relative solubilities of different kinds of ready-made pills in the market, etc., and including Cachet de Pain.*  
*PIL. QUININE SULPH., TWO GRAINS.*

Varieties.	In one fluid ounce of water at 98°, shaken every 3 minutes.	In one fluid ounce of water at 98°, shaken every 3 minutes.	In one fluid ounce of water slightly acidified, shaken every 3 minutes.	In one fluid ounce of water at 98°, acidulated, and containing a trace of opium; shaken.
Pain, uncoated pill (excipient glycerin).	Completely disintegrated in 1 hour.	Completely disintegrated in 10 minutes.	Completely disintegrated in 3 minutes.	Completely dissolved in 10 minutes.
Sugar-coated pill.	Tastes bitter in 15 minutes; disintegrated in 3 hours.	Tastes bitter in 3 minutes; in 6 hours deep ridges appeared on surface.	Sugar off in 5 minutes; disintegrated in 25 minutes.	Bitter in 3 minutes; dissolved in half an hour.
Compressed or lenticular.	But slightly affected in 30 minutes; in 1 hour not one-fourth dissolved.	Hardly affected; not dissolved in 3 hours.	Sharp edges gone in 10 minutes; in 30 minutes half gone; in 40 minutes dissolved.	Dissolved in half an hour.
Gelatin-coated.	Coating swelled partially in 1 hour; quinine not all dissolved in 15 hours.	Gelatin affected in 20 minutes; pill retains its shape for 24 hours.	Not affected in 5 minutes, nor in 30 minutes; slightly bitter in 57 minutes; gelatin swelled up in 6 hours.	Bitter in 20 minutes; disintegrated in 1 hour.
Quinine inclosed in a wafer or cachet de pain.	Quinine completely shaken out in a few moments.	Quinine completely shaken out in a few moments.	Quinine completely shaken out in a few moments.	Quinine completely shaken out in a few moments.

*PIL. CATHARTIC COMP., U. S. P.*

Varieties.	In one fluid ounce of water at 98°, shaken every 3 minutes.	In one fluid ounce of water at 98°, shaken every 3 minutes.	In one fluid ounce of water at 98° with 10 drops diluted sulphuric acid, shaken every 3 minutes.	In one fluid ounce of water at 98°, with 10 drops liq. potassa, shaken every 3 minutes.
Pain, uncoated pill (excipient glycerin).	Disintegrated in 1 hour.	Disintegrated in one hour.	Not disintegrated in one hour and a half.	Gone in 15 minutes.
Sugar-coated pill.	Disintegrated in one hour and a half.	Disintegrated in one hour and a half.	Water colored in 10 minutes; nearly disintegrated in 1 hour.	Disintegrated in half hour.
Compressed or lenticular.	Disintegrated in two hours.	Disintegrated in one hour and a half.	Slightly colored; not disintegrated in 1 hour.	Disintegrated in quarter of an hour.
Gelatin-coated.	Swelled enormously, but intact for 12 hours.	Gelatin swollen, but water not colored in 2 hours.	Swollen up in 2 hours; water not colored.	Not disintegrated in two hours.
Quinine inclosed in a wafer or cachet de pain.	Powder shaken out in a few moments.	Powder shaken out in a few moments.	Powder shaken out in a few moments.	Powder shaken out in a few moments.



In connection with this matter the writer noticed that the *glue-coated* compound rhubarb pill seemed rather smaller than the plain pill of the same kind, and, indeed, lighter in weight than the manufacturer himself advertised them, as will be seen below :

*Pil. Rhei Comp., U. S. P.*

Rhubarb, . . . . .	2 grains.
Soc. Aloes, . . . . .	1½ grain.
Myrrh, . . . . .	1 "
Oil Peppermint, . . . . .	¼ ʒ.
Water, . . . . .	q. s.
Total, . . . . .	5 grains at least.

*From Manufacturer's List.*

Rheum, . . . . .	2 grains.
Aloes, Soc., . . . . .	1½ grain.
Myrrha, . . . . .	1 "
Ol. Menth. Pip., . . . . .	—
Total, . . . . .	4½ grains.

(Not including excipient.)

Five of the pills were weighed ; result as follows :

No. 1, . . . . .	4.3 grains.
No. 2, . . . . .	4. "
No. 3, . . . . .	4.1 "
No. 4, . . . . .	4.2 "
No. 5, . . . . .	4. "

Total, . . . . .  $20.6 - 20.6 \div 5 = 4.1$  gr. average.

When the coating was carefully peeled off they were weighed again, and averaged *net 2.8 grains*, showing a deficiency of some ingredient or ingredients, amounting to 44 per cent.

The writer did not have the time to examine any other of the glue-coats in this respect, but has frequently noticed a difference in the weight of the compressed pills (as furnished by a manufacturer) from the normal weight ; and further that they are sometimes quite damp when fresh, and dry out and crumble after being kept a little while.

The powerful pressure, often brought to bear to cause the dry materials to cohere, often operates unfavorably in this

variety of pill, except in a few instances where the ingredient is readily soluble, as bisulphate quinia, bromide or iodide of potassium, etc., etc.

It may not be known that this variety can be made readily by the pharmacist himself, if he so desires, by having a mechanic make a simple piece of apparatus.

Take a solid cylinder of iron  $2\frac{1}{2}$  inches long and 1 inch across the shortest diameter, and have a hole three-sixteenths

FIG. 66.



of an inch in diameter drilled through the middle of the cylinder through the longest axis; now have a steel rod  $3\frac{1}{2}$  inches long and nearly three-sixteenths of an inch in diameter made, to fit the aperture in the cylinder.

Now have, say half an inch cut from the end of the steel rod, and have a depression turned into the end of the shorter

piece to form a mould of half of the pill desired; then have an exactly corresponding depression made in the end of the longer steel rod, and with the exception of finishing, or polishing, the thing is complete.

To operate, place the cylinder (with the shorter steel mould in the bottom) on an iron plate or suitable surface, and introduce the iodide of potassium, for instance; having inserted the longer rod; strike it with a wooden mallet a quick blow, then lifting the whole cylinder, by another blow or two, drive all through, and the pill rolls out finished.

By having two operators, one to fill into the cylinder, and the other to strike with the mallet and release the pill, they may be made quite rapidly.

PHILADELPHIA, Eighth Month 17th, 1875.

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## ON SUPPOSITORY MOULDS.\*

BY RICHARD V. MATTISON.

QUERY 13. — Within the last few years a number of new suppository moulds of different forms have been introduced. Which of them seems best adapted for practical purposes?

AFTER a somewhat extended examination of nineteen varieties of suppository moulds at present to be found in our market, and the opinions of a large number of our most intelligent pharmacists throughout the Eastern, Middle, and Western States, given due consideration, we are of the opinion that the moulds exhibited as follows are best adapted to the wants of the profession.

Suppositories are prepared by either one of two processes, conveniently known as the "cold process" and the "melting process." Full directions for each process having appeared in the American Journal of Pharmacy, it is not necessary to repeat them here, the issue being, "Which *mould* is preferable?"

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\* Read at the fifth session.



For the preparation of suppositories by the cold process, for the use of the manufacturer or extensive retailer, the mould invented by Mr. A. M. Knowlson, of Troy, N. Y., is without a rival. By its use suppositories can be rapidly prepared with little exertion and without loss of material, or separation of medicament. Another advantage is that the youngest apprentice can "run the machine" as well as the skilled pharmacist. The only and serious objection to the above mould is its price, which is held at \$50. I neglected to state that by its use rectum, vaginal, or urethral suppositories can be prepared with equal facility.

Where the pharmacist has orders occasionally for from three to a dozen or more suppositories, the mould invented by Mr. George W. Sloan, of Indianapolis, Ind., is much preferable to any yet devised for the preparation of these articles by the cold process. It is especially adapted to the wants of the retail pharmacist, is simple, accurate, and inexpensive. We exhibit a sample of mould as designed for the trade.\*

The "melting process" is esteemed by many as the only proper and perfect method of preparing suppositories. To those desiring to prepare suppositories by this process, the mould offered to the trade by Messrs. Benton, Myers & Canfield, of Cleveland, Ohio, is far superior to any other, we, of course, taking price into consideration, while for any price it has not its superior, if even its equal, among the entire list of moulds. We exhibit three of these moulds with prices annexed: the first, without the improvement or "cut-off," at \$8; second, the same with cut-off, at \$9; third, the same with cut-off and handles, at \$10. The first is, in our opinion, *the* mould, the improved cut-off being the only objection to the second and third varieties. The mould is inexpensive, and, we believe, as perfect as is possible to make a suppository mould. It is adapted to the wants of the smallest retailer or the largest manufac-

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\* At present this mould is not for sale, Mr. Knowlson claiming that it is an infringement of the patent granted him. Negotiations are now pending. Should Mr. Sloan prove successful in them, this mould will be offered to the trade by Messrs. Browning & Sloan, Indianapolis, Ind., at the following prices: rectum, \$3; vaginal, \$4.

turer. It has been urged that by the use of this class of moulds separation of the medicament is likely to occur, and the medicinal portion to be found in the apex of the suppository. We suppose it needless to remind those urging this objection, that in the hands of *pharmacists* such evidences of unpharmaceutical skill never occur. It is for this class that the above mould is designed.

Boston, Ninth Month 6th, 1875.

## NOTE ON PREPARATIONS OF PARAFFIN OIL.\*

BY JOSEPH L. LEMBERGER, LEBANON, PA.

SOME interest has been manifested during the past year in the use of paraffin oil as a probable means of producing a permanent base for ointments, or introduction into use for therapeutic value or merit of its own. The writer is induced to present this paper as a sequence to the one in answer to Query 26, assigned to him at the meeting in Richmond, and read before the last meeting of this Association.

Paraffin oil is found in the market of various qualities and under many names or brands, in color varying from a light amber to a dark brown, and having gravity varying from 24° to 35° Baumé. Oil of the latter color, and having a gravity of from 25° to 30° Baumé, has proved the most satisfactory so far as experimented with, and almost proving too that the cruder the oil, the more satisfactory the result; this deduction is made from having experimented with a very handsome amber-colored paraffin oil of 26° and 28° gravity, with results not near so favorable as those obtained from the very dark-colored oil, the difference seeming to be a want of union between the oil and added paraffin, doubtless occasioned by the existence in this class of oil of more of the lighter petroleum products. These lighter paraffin oils may be mixtures of various oils only, rather than actual paraffin products. Somewhat more experience is needed to learn just where to get the kind of oil of a uniform quality that will produce equal results each time. The best results thus far have been

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\* Read at the third session.

obtained from what is known in the market as "Smith's Ferry Oil," and yet we have met with two qualities of this oil each giving different results.

By experimenting with these oils we find that percolation through animal charcoal renders some of them nearly odorless and colorless, and measurably fits them for the purposes of an ointment or cerate.

The writer does not presume to have settled the question, whether paraffin oil has any pharmacal or therapeutic claim of importance, yet as some of the members of this Association, as was manifest last year (notwithstanding some criticism to the contrary), believe that preparations supposed to be akin to paraffin ointment, though vested with the empiric's robe, have merit, it certainly then invites us to an inquiry as to whether this very abundant product of one of our leading national industries can be practically utilized.

We find that an ointment can be made having very little odor, and where the olfactory sense is not too delicate or sensitive, would be unobjectionable as regards odor, and we have learned also, that by making a cerate with pure beeswax, this odor is entirely or very nearly masked. Specimens are herewith presented:

The crude Smith's Ferry brand of paraffin oil.

The same oil after a third percolation through coarsely granulated animal charcoal.

Paraffin ointment made with the third percolate oil 30° B., 8 parts, and pure paraffin, 2 parts.

R.—Paraffin Oil, 30°, . . . . .	8 parts.
Pure Paraffin, . . . . .	2 parts.

An ointment made with

R.—Paraffin Oil, second percolate, 30°, . . . . .	8 parts.
Pure Paraffin, . . . . .	1 part.

An ointment made with

R.—Paraffin Oil, third percolate, 30°, . . . . .	8 parts.
Pure Paraffin, . . . . .	1 part.

A cerate made

R.—Paraffin Oil, third percolate, 30°, . . . . .	8 parts.
Purified Beeswax, . . . . .	1 part.

A pomade of paraffin made

R.—Cerate of Paraffin, . . . . . 1 ounce.  
 Ol. Rose, . . . . . 2 drops.  
 Ol. Bergamot, . . . . . 8 drops.

An ointment of paraffin somewhat resembling an empiric preparation, which I will not name, and save offence to pharmacutic ears polite.

R.—Third Percolate, 85°, . . . . . 8 parts.  
 Paraffin, . . . . . 1 part.

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AN ESSAY ON PARAFFIN AND ITS USES IN PHARMACY.\*

BY B. F. STAGGY, CHARLESTOWN, MASS.

AT the last meeting of the American Pharmaceutical Association, the above subject was referred to me. Had I been present, I should not have accepted it, as it is a subject which has been presented in nearly every report of the proceedings of this Association for the past fifteen years, and its various uses in pharmacy have been defined and illustrated more than once at our annual meetings, though many chemists are still investigating its properties, the discovery of which they regard as yet in its infancy, and that new properties will be found, and more extended uses made of it.

The discovery of petroleum, this wonderful production of nature, in this country in such vast and inexhaustible quantities; the importance it has gained as an illuminating material and for industrial purposes of various kinds; its variety of products, and the new uses to which they are applied, all combine to make it one of the greatest sources of wealth and industry we have in our possession; and to-day, among the exports of this country, it ranks only second to cotton.


It was known two thousand years ago to the Greeks and Romans, and is found in various parts of the world, but no-

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\* Read at the third session.

where in such profusion as in this country. For more than two centuries Parma and Modena have furnished petroleum for Italy. It has been used in Burmah for ages. Bakoo, in Georgia, supplies the Persians with it. It is found in Cuba and Trinidad. It was used by the Indians of this country for medical purposes as far back as the earliest discoveries. It is seen floating on the water in the vicinity of volcanoes, and new discoveries of it are constantly made.

The increase in the flow of oil in Pennsylvania since 1867 has been nearly fifty per cent. The export of petroleum in 1860 was only 1,500,000 gallons; in 1868, 99,000,000; in 1870, 141,000,000; and to-day, 300,000,000 gallons are annually consumed, "enough to cover Boston Common to a depth of twenty-three feet; Central Park, New York (900 acres), to a depth of one foot six inches. It would fill a pipe five and one-half inches in diameter and forty-four thousand miles in length, a little more than twice the circumference of the earth. If packed in barrels, placed end to end, they would form a chain six thousand eight hundred miles long; or, a double column, stretching considerably further than from here to England. All the crude oil that comes to the seaboard is brought in tank-cars, having an average capacity of 3600 gallons each. There are about three thousand of these cars now in use, although the numbers on them run as high as five thousand six hundred. The great bulk of the oil produced goes to New York, where it is pumped into large iron tanks, erected at the termini of the different lines, some of these tanks holding thirty thousand barrels, or 1,200,000 gallons. The total storage capacity of all the yards is about 8,000,000 gallons. From these yards the oil is taken in tank-boats or barges, of which there are forty, with a total carrying capacity of 1,300,000 gallons, to the different refineries, where it is converted into kerosene, naphtha, paraffin, coal-tar, and the like. One-tenth of all the oil received in New York last year was consigned to a single house in that city, and the refined oil or kerosene resulting from the distillation (seventy-five per cent.) was packed by them in tin cans and cases, and shipped abroad, nearly every country importing more or less of it. Most of





the shipments are made to the Mediterranean, to Australia and the East Indies, China and Japan taking it in large quantities, and giving promise of soon becoming the two largest markets."

Petroleum is considered by many to be possessed of rare medicinal properties. It has been used with success as a dressing to suppurating wounds, and the crude oil, such as is used for lubricating purposes, is highly recommended for burns, also an excellent application for the itch. In domestic practice the refined oil has long been used as a liniment for rheumatic pains, etc.

The discovery of paraffin has been generally credited to Reichenbach. According to Wittstein, the late Dr. Buchner discovered it in 1820, ten years before Reichenbach mentions it. Dr. Buchner named it *bergfett* (mountain fat), and describes its properties accurately. Paraffin of the first quality resembles wax, and is not affected by light or air. The melting-point of the grade A, manufactured by the Downer Kerosene Works, is 130°; B, 125°; and No. 2 (the soft gum-stock), 120° and upwards. It is soluble in benzol, chloroform, and bisulphide of carbon. It has a peculiar feeling while held in the hand, and produces insensible perspiration. It can be made from the destructive distillation of any fatty oils. Pagen recommends "the difference of the melting-point as reagent for the detection of paraffin in wax." "Another test is to saponify the wax, evaporate to dryness, and extract the paraffin by ether." Its specific gravity is .871; beeswax, .968.

Dr. Miller, in the American Journal of Pharmacy, January, 1874, gives an accurate account of its manufacture, which is copied in the Proceedings of this Association last year. The same gentleman has very thoroughly ventilated the adulteration of beeswax by paraffin, giving tests for its detection, which may be found in the American Journal of Pharmacy, November, 1874. He says: "There seems to be a considerable difference in the mode of contraction, while cooling, between beeswax and paraffin, and this may serve to detect the adulteration, at least when practiced to a large extent. Blocks of paraffin are decidedly concave on the top, and the speci-

mens of adulterated wax herewith presented will be observed to be more or less concave on the top, in proportion to the amount of paraffin which they contain. Pure beeswax appears to be level, the contraction acting in a horizontal direction, and tending rather to the production of vertical fissures." He also urges the attention of the Pharmacopœia Committee to paraffin, "since it has been detected forcing its way into pharmacy under the garb of beeswax, cosmolin, and vaselin." Immense quantities of this article is used in the manufacture of candles, both in this country and England, and it makes an excellent article. The next largest purchasers are the refiners of beeswax, who use enormous amounts in the adulteration of that article. The average price of paraffin is from twenty-five to thirty-five cents per pound, and the average price of beeswax forty-five to sixty-five cents; spermaceti about the same.

Prof. James F. Babcock, in an essay on beeswax (p. 874 of Proceedings, 1867), says: "Paraffin is capable of taking the place of wax to a much greater extent than has been supposed. When melted with oils it forms crystalline scales on cooling, but this property is entirely destroyed by the addition of five to ten per cent. of wax, this addition causing the mixture to cool in a homogeneous mass without crystallization." Paraffin, in solution in naphtha or bisulphuret of carbon, has been used as an application to cloth to render it waterproof; and to metallic surfaces, gilt or tinselled articles, etc., as a protective varnish. It may also be found suitable as an application to leather, cordage, etc., for the same purpose. A saturated solution of paraffin in benzol has been used with success in preserving pictures and photographs. Paraffin has the advantage over other greasy matters in not becoming colored by time. Large quantities are sold to confectioners, who purchase the soft or gum-stock, which is used largely in chewing-gums and some of the varieties of soft candy. It has been used with success in coating fruits, which retained their freshness for months; also for coating the interior of barrels. The manufacturers of some of the varieties of friction-matches use this article to render the wood more inflammable, and it is

also beginning to be largely used for laundry purposes, many retailers having daily calls for it for that purpose. It is useful in the preservation of wood, and meat has been kept good many weeks by immersion in it. It is used in starch manufactories to give a gloss to starch. Falke recommends it as a substitute for the more expensive wax in the preparation of wax paper. He says: "Paraffin is not only much more easily applied than wax, but, as before stated, is much less costly, and will no doubt soon rival parchment paper in its application. The melting-point of the different bodies presenting the appearance and properties of paraffin lie between  $110^{\circ}$  and  $149^{\circ}$ , which is a lower temperature than that required for the liquefaction of wax, and hence it is more easily applied, and remains in a fluid condition for a longer time, which enables it to permeate the paper more readily. The wax-paper on being slightly overheated chars very easily, which is avoided to a great extent by using paraffin, inasmuch as the latter body volatilizes or distils off unchanged at a high temperature. Wax-paper, when kept for some time, emits an offensive odor, which is not the case with paraffin. Paraffin is not attacked by acids or alkalies, which renders it useful for many purposes in which wax does not answer; at the same time it is nearly fifty per cent. cheaper than wax, and permeates paper about one-third more rapidly." The amount of this article imported is not large. In 1873 only 415 pounds were imported, and 2063 pounds of paraffin candles. Neither is the exportation large when compared with the large amount used in this country. In 1874 the value of the exportation from New York was \$63,481; from Boston, \$1455; Philadelphia, \$384; total, \$65,270. The result of the writer's investigations in regard to this article are, that it possesses many qualities which render it useful in the laboratory, and that it is gradually working its way into pharmacy, and is destined to become extensively used in our profession for a variety of purposes.

In the Proceedings of 1860 the late Charles T. Carney, of Boston, furnished a paper on "Paraffin and its Substitution for Wax in Cerates," with samples of ung. simplex, with an

entire substitution of paraffin for white wax; also four samples of ung. aq. rosarum, with substitution of this article for wax and spermaceti. The result of the investigations of this eminent chemist were favorable to its use. Binert recommends it for the above purposes, in the proportion of one part to four or six of lard. If its tendency to crystallization could be overcome in a greater degree, it would grow rapidly in favor, as it is maintained by good authority that it is possessed of rare medicinal qualities, that it has an emollient effect on the skin, that it is useful in skin diseases, etc. Some think it slightly irritant to the skin. It is substituted for oil in baths, as it endures a higher temperature without evaporating or emitting any unpleasant odor. Filtering-paper, after being soaked in it, may be kept several weeks in concentrated sulphuric acid without undergoing the slightest alteration; for this property, it is employed with advantage as a coating to labels on bottles containing strong acid; fluoric acid does not act upon it except it be heated. Its value for luting purposes is too well known to be mentioned. At the Downer Kerosene Works there are three varieties of this stock manufactured, viz., A, test  $130^{\circ}$  melting-point; B, test  $125^{\circ}$  melting-point; and No. 2,  $120^{\circ}$  and upwards. The elegant sample which you see before you, so firm and solid in its structure, is No. A; the other, which appears to be lighter and more porous, is No. 2, which is the quality recommended by Mr. Merrill, of the Downer Works, for pharmaceutical purposes, it being softer and less liable to crystallize. The failure of so many pharmacists to make a handsome ointment with this valuable agent may be attributed in a great measure to their using the harder quality of paraffin. I have before me a sample of the odorless paraffin oil made at the same place, which is recommended as a substitute for almond oil, and which is claimed to possess all its qualities; also a sample of kerosene oil nearly odorless. I have also before me two specimens of ung. simplex, made respectively with the hard and soft paraffin, substituted for wax. I have also used it as a partial substitute in ung. aq. rosarum with success, and am

confident it can be used in many other ointments with advantage.

As this subject has been brought before your notice so many times, the writer considered it unnecessary to bring a large variety of samples, most of the profession having experimented with it; but he cherishes the hope that the next edition of the United States Dispensatory will give it a more extended notice, and that the Committee on the Pharmacopœia will consider thoroughly its claims.

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### UNGUENTUM HYDRARGYRI NITRATIS.\*

BY JOSEPH S. WHALL, BOSTON, MASS.

THE first mention that is made of unguentum citrinum, or yellow ointment, as it was called, is in the Edinburgh New Dispensatory, which was published in the year 1786, on page 664. The formula for its preparation was as follows: Take of quicksilver, 1 ounce; spirits of nitre, 2 ounces; hogs' lard, tried, 1 pound. Dissolve the quicksilver in the spirits of nitre, by digestion in a sand-heat; and whilst the solution is very hot mix with it the lard previously melted by itself and just beginning to grow stiff. Stir them briskly together in a marble mortar, so as to form the whole into an ointment.

This ointment was officinal in the first Pharmacopœia of the United States, published in the year 1820, under the name of unguentum hydrargyri nitratis. The formula was given in *parts*, which I think was an improvement over the present officinal formula, and on the opposite page were the formula and the directions in Latin; the proportions were as follows: Take of purified mercury, by weight, 1 part; nitric acid, 2 parts; olive oil, 9 parts; lard, 3 parts. The directions were similar to those of the Edinburgh New Dispensatory.

Either of the formulas make an ointment that will com-

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\* Read by title at the sixth session.

pare favorably with any of the various combinations of lard and oil.

The formula for the ointment in the United States Pharmacopœia of 1830 was changed, but not for the better, and was as follows: Take of purified mercury, an ounce; nitric acid, 11 fluid drachms; fresh neat's foot oil, 9 fluid ounces; lard, 3 ounces. This, like the United States Pharmacopœia of 1820, had the formula and directions, on the opposite page, in Latin.

In the substitution of the neat's foot oil for the olive oil I do not see the advantage, as good olive oil (or an oil passing for that) can always be obtained, but it is almost impossible to obtain pure and fresh neat's foot oil.

The formula of the United States Pharmacopœia of 1840 remained the same, except mercury was stated to be used in place of purified mercury; and it was the first United States Pharmacopœia that omitted the Latin.

The composition of the ointment in the United States Pharmacopœia of 1850 remained the same. Directions being given to heat the melted lard and oil to a temperature of two hundred degrees before adding the solution.

The composition of the ointment and the directions were the same in the United States Pharmacopœia of 1860, the proportions of the ingredients only being changed.

In the United States Pharmacopœia of 1870 lard was substituted for the oil that was used in the previous ointment, but without any special advantage, except doing away with the neat's foot oil; thus making an ointment of the same composition as that made by the formula of the Edinburgh New Dispensatory of 1786.

As almost every one of the common oils, including castor, olive, sperm, flaxseed, raw and boiled, benne and neat's foot oil, mixed with lard in different proportions, have been tried with various results, but none of them furnishing an ointment that gave universal satisfaction as regards color, its keeping properties, and consistence, the following formula for its preparation is offered: Take of mercury a troy ounce and a half; nitric acid, three troy ounces and a half; pre-

pared beef-suet, sixteen troy ounces and a half. Dissolve the mercury in the acid; then heat the suet in an earthen vessel, and when the temperature reaches one hundred and seventy-five degrees remove it from the fire. To this add the mercurial solution, and, with a wooden spatula, stir occasionally until the ointment stiffens. This furnishes an ointment of a beautiful yellow color, of uniform consistence, and keeping, I think, better than any of the various mixtures of oils and lard.

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## II. MATERIA MEDICA.

### GRINDELIA ROBUSTA.\*

BY JAMES G. STEELE.

CONSIDERABLE attention has been directed of late years to the California "grindelias," specimens of which are to be met with in different parts of the State, and which early attracted the attention of the Jesuit fathers who established "missions," under the patronage of the Mexican government, some sixty or eighty years before the conquest of the country by the Americans.

Divers botanists, who have visited our State from time to time since the establishment of these missions for the "regeneration" of the native races, have also noticed and written about the grindelias.

Several writers, among whom may be mentioned Shelton, Gibbons, Canfield, and Smith, have published from time to time information touching the natural history and therapeutic effects of the grindelias; but it is particularly the "*Grindelia robusta*" which I desire to introduce to the notice of our profession. *Grindelia robusta* seems to exercise a specific effect in cases of poisoning by the famous or more properly *infamous* "poison oak" of California. Of late years its happy effects in reducing the frequency and violence of

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\* Read at the sixth session.




the spasmodic constrictions of the throat and contiguous organs, from asthma and kindred diseases, are so well authenticated as to claim for it a new and important place in our national *Materia Medica*.

In the woods and thickets of California, as well as on the dry hillsides, in fact in every variety of locality, may be found a very venomous shrub, the "poison oak," or "poison ivy," the "*hiedra*" of the Spanish and native California people, the dread of all those who are acquainted with it. This plant is known to botanists as "*Rhus diversiloba*" or "*Rhus toxicodendron*," and resembles the poison ivy of the Atlantic States both in appearance and poisonous qualities. It has a somewhat climbing stem, with short, leafy branches, and is easily recognized from the fact of the discoloration of many of its leaflets, caused by the oxidation of the green coloring-matter of the plant, in this respect differing from other shrubs and climbing plants.

As is well known, poison oak is the cause of a vast deal of misery and suffering in California. There is scarcely ever a time, in any little town or neighborhood, when there are not one or more persons suffering from it, and it has been estimated that there are in this State near three thousand persons constantly afflicted with the cutaneous disease caused by this dreaded scourge. Not only tourists and occasionally visitors into the rural districts from our cities, but even farmers and laborers are liable to this poisoning, and besides the suffering and annoyance caused by it, the loss of valuable time is no small item to be taken into account. As has been often remarked it would seem that whoever makes known a prompt and sure antidote to this poison would be considered a public benefactor.

Many and various have been the "remedies" with which our local practitioners have endeavored to combat the effects of the universally dreaded poison oak. When I mention a few, such as lotions and ointments of lead, bismuth and opium compounds, applications of hartshorn and various alkaline salts in every variety of combination, it will be seen that not only is this scourge of wide prevalence, but of deep





practical interest to the physician and pharmacist, for every medical practitioner meets with more or less cases of it in his daily rounds.


The many remedies which have been used for counteracting the effects of the poison oak, all give way in efficiency and celerity to the *Grindelia robusta*.

This, like the *Rhus toxicodendron*, is indigenous to the State, and found in many parts, but grows most luxuriantly in the foothills of the Sierra Nevada and Coast Ranges of mountains.

*Grindelia robusta* is a tall, stout perennial, belongs to the Composite family, and looks like a small sunflower. It is from one to three feet in height, and has bright yellow flowers in heads, one to two inches in diameter, flowering from June to October. Before flowering the unexpanded heads or buds secrete a quantity of resinous matter, white and sticky, like balsam, that is finally, after the flower expands, distributed like varnish over the petals of the flower. The whole plant, at this season, flowers and leaves, is resinous and viscid. When it grows in dry hills it is stiff and rigid, with narrow thin leaves; but in damp localities it is more robust and succulent, with wide fleshy leaves. May and June are the months in which the *grindelia* should be gathered for use, as at that time the plant abounds most in the balsamic and resinous juice in which its medicinal properties reside, and causes its marvellous effects in the cure of the eruption from oak poisoning, and the suppression of asthma, for which latter purpose it has been used with good effect since the occupation of the country by the Americans.

Dr. C. A. Canfield, of Monterey, California (deceased), was the first to call the attention of the medical profession to the therapeutic action of *Grindelia robusta* in cases of oak poisoning.

Some twelve years since he caused to be published, in the Pacific Medical and Surgical Journal, a short account of this plant, its botanic features, habitat, and medicinal value. My attention being thus directed to the plant, I procured specimens, and prepared various pharmaceutical compounds con-



taining the virtues of the drug, which were prescribed by the medical faculty of this city, with sufficient success to warrant me in keeping a sufficient supply of the plant. It has been my practice yearly, during the month of May or June, to go into the rural districts and have gathered, and dried in the shade, from one to two tons of *Grindelia robusta*.

Since the mention made by Dr. Canfield as above, however, a new use has been found for this variety of the *grindelias*,—asthma and its kindred ailments have been made to succumb in a remarkable manner.

Dr. Q. S. Smith, of Cloverdale, Sonoma County, California, published in the *Pacific Medical and Surgical Journal* for April, 1875, some notes on the efficacy of the solid extract of *Grindelia robusta* in several cases of asthma, etc., which had come under his observation. He writes that one patient to whom pills made of the solid extract were administered, "had suffered from severe and frequent attacks of asthma since childhood, and found no relief from many physicians and divers remedies. About five months ago he commenced taking the extract of *grindelia* in pills of three grains each, one three times a day for two or three days, then a pill at bedtime only, for eight or ten days longer. Under this mode of treatment the attacks became lighter and more remote, and during the interval between the attacks he gained in flesh and strength, and improved greatly in his general health. More than four months have passed since the patient has felt any symptoms of the approach of his old enemy, once the plague and terror of his life. He is now heavier and stronger than ever before in his life, and can climb the rugged mountains of his sheep-ranch and the surrounding country, looking after stock and hunting game, with an endurance, agility, and speed, unsurpassed by any of his neighbors. We think this happy change due entirely to the virtues of the remedy mentioned, as our patient took no other medicine, and continued to follow the same employment, and was circumstanced just as he had been for years before."

I send herewith samples of the entire tops of the plant *Grindelia robusta*, and fluid and solid extracts made from the

same according to the description below. I have had grindelia from all sections of the country, but have found that the plant grown in the rolling country or so-called "foothills" is the best. The specimens I send were obtained from Green Valley, a township in Solano County, about sixty miles north-east of San Francisco, and were gathered in the month of May, 1874, from the hillsides of that section. About two and a half tons were picked, dried in the shade, and securely packed against influence of changes of weather or ravages of insects, etc.

I have experimented in different ways to obtain a "fluid extract" which should fully represent the medicinal virtues of the leaves and flowering tops of the plant. Sample No. 1 is made with the officinal alcohol, and represents in one pint the strength of sixteen troy ounces of the dried leaves and tops of the plant. The grindelia, even when well dried, contains a large proportion of the sticky "balsam" before mentioned, and repeated experiments have shown me the inutility of attempting to proceed with it as in the treatment of the ordinary bark, roots, leaves, etc., as in grinding or comminuting in a drug-mill or mortar. I have found the most feasible method and the one furnishing the most satisfactory results, to be that of macerating the carefully picked leaves and tops in a suitable vessel with strong alcohol, enough poured on to not quite cover the mass, for a period of twenty-four hours, a strong cover being laid over and pressed down with appropriate weights. At the expiration of this time the whole is transferred to a percolator with stopcock attached, and after remaining for five or six hours, the resulting liquid drawn off and the residue in the percolator taken, transferred to strong bags, and submitted to the action of a powerful press. The liquid from this is now mixed with that from the percolator and set aside. It is generally requisite to repeat the process with one-half the amount of menstruum, and the results being mixed together should measure one pint for every sixteen troy ounces of the drug employed. In case, however, the full measure requisite is not obtained, enough alcohol is added to supply the deficiency, and the whole rapidly filtered and transferred to

well-stoppered bottles. This process gives a clear, thin, nice-looking fluid extract, with a pleasant odor and characteristic aromatic taste, and which can be kept a long time with usual precautions without any deposit. Considerable objection has been made, however, to the use of strong alcohol in preparing the fluid extract for external as well as internal use, and the sample marked No. 2 is a hydro-alcoholic fluid extract made like the above, save the substitution of one part of water to two of alcohol, which gives a fluid extract equal in all respects to the former save in appearance, a slight turbidity being apparent when a small quantity is held to the light. It has been my custom of late years to dispense and furnish to the trade the fluid extract of *grindelia* made in this manner unless otherwise directed.

It may be presumed that the medicinal virtues of the *Grindelia robusta* reside in the sticky, viscid, and resinous juice before mentioned. Confirmatory evidence offers itself in the fact that the plants gathered from the lower and marshy grounds are more robust and succulent, the leaves and stalks larger and coarser in appearance, and devoid almost entirely of the "balsam" before mentioned, and as has been observed, of little efficacy in asthma and the eruption from oak poisoning.

Experiments made on the freshly gathered undried plant with various solvents, have not produced "extracts" differing in therapeutic effect or physical properties from the dried plant as above. No attempt has been made to investigate the viscid juice, but doubtless like the "balsams" or "liquid resins," it contains various constituents and probably a volatile oil to which its remedial effects and strong characteristic odor and taste are to be partly attributed.


I send, also, a sample of the solid extract of *grindelia* suitable for making pills to be given in violent and prolonged attacks of asthma, etc. This extract is made by taking the tops and leaves of the plant and operating upon them with a mixture of equal parts of alcohol and water, extracting the soluble elements in the same manner as described in the process for making the fluid extract, distilling off one-half the

bulk in a Procter's still, and slowly evaporating the residuum to the consistency of a thick syrup, adding a minute quantity of glycerin, and pouring while yet warm into suitable jars, when upon cooling it will be found to be of the consistence of an ordinary solid extract and easy of manipulation by the dispenser. The "directions" to be observed in the administration of these medicines are not very elaborate, and can be quoted here with advantage.

For "poison oak" eruption, the method suggested is, to mix one or two teaspoonfuls of the fluid extract of grindelia with half a tumbler of cold or tepid water, and apply freely with a sponge or cloths dipped in the mixture to the parts affected. One or two applications will often suffice for a cure, but if the disease has been of long duration, several days may elapse before entire relief is obtained. In severe cases of poisoning, cloths dipped in the solution may be bound upon the parts, and, if necessary, more of the fluid extract added, thus increasing the strength of the application. The most obstinate case of poisoning will give way to this mode of treatment, and immediately after the first application a most surprising relief is experienced. In cases of "asthma," "rose cold," and "hay fever," ten to twenty drops of the fluid extract may be given every half hour mixed with sweetened water or milk until relief is obtained, when the amount and frequency of the dose can be lessened according to the measure of relief obtained.

The solid extract is made into pills of three grains each, and given, as described in another part of this paper, three times a day, one or two of the pills being administered for each dose.

SAN FRANCISCO, August 17th, 1875.



## ON CINCHONA ALKALOIDS.\*

BY RANDAL RICKEY, TRENTON, NEW JERSEY.

QUERY 49.—Can the alkaloids of cinchona be extracted together in a crude form, yet sufficiently pure to permit a ready detection of adulterants? and, if so, can the process be profitably carried out by the pharmacist?

PERHAPS, within the whole range of *Materia Medica*, there is no article upon which more has been written and upon which more scientific research has been expended than the cinchona barks.

If, as is generally supposed, quinia, cinchonina, quinidia, and cinchonidia embrace the active principles of the bark, there is no practical difficulty in preparing these combined alkaloids in a crude form, by boiling the cinchona in successive portions of acidulated water, precipitating it with soda, washing the precipitate with distilled water, dissolving it in alcohol, evaporating carefully, and we have the alkaloids in a crude form.

But, when finished, what have we? If cinchona Calisaya is used, we have nearly pure quinia; if cinchona rubra, quinia and cinchonina in nearly equal proportions; if the pale varieties are used, quinia, cinchonina, quinidia, and cinchonidia, in varying proportions.

So that, practically, we should have, no doubt, an article possessing antiperiodic and tonic qualities. But what proportion of each one of these valuable alkaloids would it contain? Would not the temptation to abstract the quinia, possessing so high a market value in comparison to the others, be too strong in our present age of loose moral responsibility? And has not the recent investigation of cincho-quinine, so called, shown how easily chemists of established reputation may be deceived as to the character of such combined alkaloids?

I may be wandering from the query, but, in my opinion, give us the alkaloids pure and simple, then, with a few easily applied tests, we can detect adulteration, and the practitioner can combine or use them separately as he may elect.

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\* Read at the fifth session.

Now in regard to the economy of the pharmacist preparing for himself these alkaloids.

Official grades of cinchona, varying from 2 to 2.4 per cent. of alkaloid, cannot be bought by the retailer for less than from \$1.10 to \$1.25 per pound. Taking the largest proportion, and the lowest price, it would require 2 pounds 1 ounce of bark to produce 350 grains of mixed alkaloid; 2 pounds 1 ounce of bark, at \$1.10, costs \$2.27; 1 ounce of sulphate of quinine, containing 350 grains of alkaloid, pure quinia, \$2.35, which we can see at a glance leaves the question of economy largely in favor of buying from the manufacturer. And, besides, the magic words of P. & W., or R. & S., leave in our own minds, and those of our customers, a guarantee of purity which I believe no one ever doubts or questions.

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### ON MATICO.\*

BY JOHN M. MAISCH.

THE subject which has been referred to me is the botanical origin of this drug. The examination of a number of commercial specimens of matico has proven that they were all obtained from *Artanthe elongata*, Miq., which is the *Piper angustifolium* of Ruiz and Pavon, and is indigenous or cultivated throughout the tropical portion of South America, from Venezuela to Bolivia. The leaves, which in the commercial article are more or less broken, are from two to four and even six inches in length, lanceolate or oval lanceolate, with a finely crenate margin, an acuminate apex, an unequal heart-shaped or truncate base and a short petiole. The hairy upper surface has a tessellated appearance from the meshes formed by the depressed veins, while the lower surface shows numerous small projecting meshes of a brownish color, the intervening space being clothed with a dense whitish pubescence.

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\* Read at the fifth session.



Matico became known in the United States in 1834, through Dr. Ruschenberger, of the United States Navy, and in Europe in 1839, through Dr. Jeffreys, of Liverpool. In 1864 Prof. Bentley observed that the leaves of another species, *Artanthe adunca*, Miquel (s. *Piper aduncum*, Linn.), were wholly or in part substituted for the former, with which they agree in size and appearance, but differ by the absence of the depressed meshes upon the upper, and of the dense pubescence of the lower surface. This species is distributed over an extensive territory throughout the tropical regions of America, occurring principally in the West Indian Islands, and on the South American continent into Brazil.

A third species, *Artanthe lanceæfolia*, Miq. (s. *Piper lanceæfolium*, H. B. K.) occurs in New Grenada, and is used there under the name of matico. The same name is applied in Panama to the leaves of *Waltheria glomerata*, Presl., nat. ord. Sterculiaceæ, in Quito and Riobamba to the leaves of *Eupatorium glutinosum*, nat. ord. Compositæ, and very likely to some other plants, the leaves of which are used in different portions of South America for arresting hæmorrhagea.

The term matico is the diminutive of Mateo, Matthew, and it is said was applied to a shrub in consequence of the relief afforded to a soldier, who was nicknamed Matico. After having been wounded in action, he stopped the bleeding by pressing some of the leaves to his wound; hence, also, the names "Yerba soldado," and "Palo del soldado." The same story, with more or less variation, according to Dr. Seeman, is told of many other vulneraries of Spanish America, hence matico may be regarded as a kind of a popular generic name for plants, the leaves of which have vulnerary properties, and it resembles in this respect such terms like guaco, ipecacuanha, and others which are popularly applied to many different plants in Central and South America, or like baytree, winter-green, horseweed, itchweed, and the like, which are employed for different plants in different sections of the North American continent.



## MEZQUITE GUM.\*

BY A. W. MILLER, M.D., PH.D.

QUERY 16.—An essay on mezquite gum. It is said that large quantities can be obtained. Can it not be used advantageously in pharmacy?

To the simple inquiry proposed as above, I would answer in the affirmative. I have applied it to most of the uses of gum arabic in pharmacy, and have found it to fulfil the same purposes. Emulsions can be made of balsam copaiba, of fixed and essential oils quite as readily with it, and having fully as much permanence as when gum arabic is used. There seems to be no appreciable difference in the requisite proportions. The adhesive power of mezquite is very considerable, perhaps even greater than that of gum arabic. The mucilages and powders of both gums are equally serviceable in forming pill masses. The color of mezquite, and of the mucilage prepared from it, is rather darker than that of the best grades of selected gum arabic, and this disadvantage may prove to be an obstacle to its introduction into elegant pharmacy. A very handsome white powder can, however, be readily obtained from it.

On account of the diversity of opinions which are frequently entertained by different members of the profession in regard to the utility and advantages of new drugs, I endeavored to obtain the views of a number of pharmaceutical friends, to whom I distributed samples of the gum. The results of these trials agree in the main entirely with my own as above stated. While no one of these gentlemen observed any special merit or advantage in mezquite over and above that possessed by gum arabic, they are unanimous in considering the behavior and effects of the two gums as almost identical. A suggestion of the late Prof. Procter, published in the 27th volume of the American Journal of Pharmacy, has a direct bearing on this point. On account of the compatibility of mezquite and subacetate of lead, he advises its employment whenever it is desirable to make use of the emollient and protective influence of a mucilage in conjunction

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\* Read at the fourth session.

with the astringent and sedative action of a lead salt. He regards the association of mezquite mucilage and subacetate of lead, with sufficient glycerin to prevent it from drying too rapidly, as a good substitute for many other less elegant and less efficient dressings.

Mr. F. Kalteyer, of San Antonio, Texas, from whom I obtained my supply of mezquite, informs me that he is constantly using it pharmaceutically in place of gum arabic, and that it is preferred to the latter by brewers for the purpose of thickening and clarifying beer. He regards mezquite as being slightly astringent, and therefore recommends it in the treatment of bowel complaints, particularly when occurring among children, in which cases he is in the habit of exhibiting it as a mucilaginous drink.

I have ascertained incidentally that over a thousand pounds of mezquite have been already consumed in Philadelphia and Baltimore as a substitute for gum arabic in the manufacture of confectionery and medicated lozenges. My information is to the effect that it was found to be quite equal, but not in any way superior to the lower grades of sorts gum arabic, particularly that variety commercially known as Jiddah or Gedda gum. One of the gentlemen applied to stated that with him it was a mere question of price, as he was unable to observe any difference in their intrinsic value. Another confectioner, who consumes large amounts of gum arabic in the preparation of gumdrops and similar bon-bons, declares mezquite to be unfit to take the place of the second, or even the third pick gum, which he is in the habit of using for the finer qualities of his goods. The extremely low rates of all the different varieties of gum arabic, which prevail at the present time, of course exclude mezquite from all of the more important applications in the arts. It is, however, worthy of being put on record that our own country can furnish so valuable a substitute in case the supply of gum arabic should, at some future time, either fail entirely or become so diminished as to advance its price unduly.

Mezquite gum was prominently brought to notice in 1854 by Dr. George G. Shumard, the surgeon and geologist of

Captain R. B. Marcy's Expedition to the Brazos and Wichita Rivers. He stated at that time that the tree furnishing it is very abundant on the plains of Upper Texas and New Mexico, covering thousands of miles of surface, so that mezquite can be obtained in inexhaustible quantities. The gum exudes in a semifluid state, and hardens into rounded lumps within a few hours. By exposure to the sun it is bleached to a certain extent, though very light-colored pieces are comparatively rare. A tree will yield from an ounce to three pounds, the quantity being greatly increased by incisions made into the bark. The gum can be collected in July, August, and September, the most favorable period being the latter part of August. Dr. Shumard employed the gum medicinally in several instances, and found it to answer the purpose of the best gum arabic.

At an even earlier date than the above, the *Prosopis dulcis* of Mexico is stated in Redwood's Gray's Supplement to yield a gum, which is used in place of gum arabic, and is known by the Spanish name *goma mezquitina*.

Mr. John E. Murphy, a druggist residing in Santa Fé, New Mexico, advises me that the mezquite tree is not found within two hundred miles of his city, as it does not thrive well north of the thirty-second parallel of latitude. He has seen it growing luxuriantly on the lower Gila River in Southern Arizona, and also scattered here and there on the plains of Texas. On the Rio Grande, where it is met with only as a low, scrubby bush, the roots are frequently dug up and used for firewood; on account of their great hardness they make a better fire than either hickory or oak. The gum can only be collected from the larger size trees in remunerative quantities. Mr. Murphy gives it as his opinion that the transportation charges will amount to more than can be realized for the gum in the Eastern markets. He estimates the expense of bringing it to the railroad termini at fully five cents per pound, and about that much more from Las Animas or Grenada, Col., to the East. Mr. Murphy regretted having none of the gum on hand, but very kindly offered to send the Apaches on a special excursion after it.

Dr. O. Loew, of Washington, D. C., who was connected with one of the government expeditions, informs me that the mezquite tree is a handsome acacia, requiring but very little moisture. The pods are exceedingly sweet, and they are used by the Indians as food, as well as for the preparation of an alcoholic beverage. The wood is rich in tannic acid; being very tough, it is well adapted to the manufacture of cabinet work. Charcoal made from it is exceedingly hard and dense, so that it is well suited for smelting operations. Dr. Loew regards mezquite as identical with gum arabic, but believes it usually to contain a little tannic acid.

Mr. F. Kalteyer, who was before alluded to, has also published a note on mezquite in the Report of the Commissioner of Agriculture for 1872. He states that during the previous year it became an article of export from Texas, some 12,000 pounds having been gathered in Bexar County, and as much more between that and the coast. The gum is, however, hardly known east of the Brazos. According to this authority, it is yielded by several species of *Mimosæ* found in Texas, New Mexico, and Arizona. The species most common in Bexar County attains a height of from twenty to forty feet, with a diameter of about eighteen inches. It is often met with in localities where no other tree will live. Very handsome furniture has been made from the wood, as the grain is very fine. The gum can be gathered only during dry seasons; it is dissolved during wet weather, when it falls to the ground and is lost.

Mr. Frank T. Maynard, of Petaluma, Cal., writes that the mezquite tree is very abundant about Hermosila, Mexico, where cattle feed and fatten on the bean it bears.

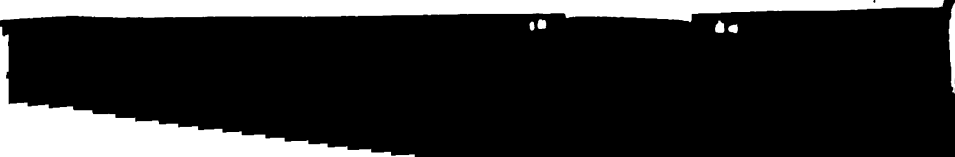
Mr. McMurtrie, of Washington, in 1873, published some remarks on substitutes for the astringent barks at present employed in the manufacture of leather. The heart-wood of mezquite is there stated to contain 6.21 per cent. of tannic acid; while the alburnum and bark contain only 0.5 per cent.

A specimen of mezquite, sent by Dr. Shumard to the President of the Philadelphia College of Pharmacy, was carefully examined by the late Prof. Procter, whose researches were

published in the American Journal of Pharmacy of 1855. Dr. Campbell Morfit, of Baltimore, also obtained some of the same gum, and published an article on it in Silliman's Journal, for July, 1855. He gives the following as current synonyms for mezquite: Muckee, mezqueet, and musquit. According to a proximate analysis performed in the laboratory of Dr. Morfit by Mr. Frederick W. Alexander, mezquite consists of 11.64 per cent. of water, .286 per cent. of foreign matter, .206 per cent. of bassorin, 84.967 per cent. of arabin, and 3 per cent. of ash. Prof. Procter found only 2.1 per cent. of ash; while gum arabic is stated to vary from 2.7 to 4 per cent.

It may seem somewhat strange that a sophistication of a drug of such very recent introduction should be already met with, though in this instance the substitution was probably due to ignorance, rather than to fraudulent intentions. Not being previously acquainted with the physical characteristics of true mezquite, the recognition of the false gum was entirely due to the very marked difference in the chemical reactions of one of my specimens from those given by Prof. Procter, which agree in the main with those I obtained from Mr. Kaltetey's sample. The gum in question had been obtained for me from the interior of California, the purpose being stated for which it was wanted. Being very much puzzled in attempting to account for its peculiar behavior, I made very searching inquiries concerning its origin, and, after considerable delay, I was advised that it had been procured through a wholesale house in San Francisco. No one about this establishment could tell definitely whence it was derived, or where it came from, but they *thought* that it came from Australia. The substance is therefore most probably the Australian or wattle gum, as it seems to agree with Flückiger and Hanbury's description of this article.

In order to present the various reactions in as concise and definite a manner as possible, I have arranged them in a tabular form, so that they can be compared at a glance. I have included also the experiments as far as given by Prof. Procter, and finally the parallel behavior of true gum arabic.



	True Mesquite.	Prof. Procter's Mesquite.	Gum Arable.	False Mesquite.	Selected dark pieces of false Mesquite.
Concentrated solution of borax.	No effect.	Not altered.	Gelatinized.	Somewhat thickened.	No effect.
Neutral acetate of lead.	" "	" "	No effect.	Slight cloudiness.	" "
Subacetate of lead.	" "	" "	Gelatinous precipitate.	Gelatinous precipitate.	" "
Ammonia after acetate of lead.	Gelatinous precipitate.	Bulky, gelatinous precip.	No effect.	No further change.	" "
Ammonia after subacetate of lead.	Thick, gelatinous precip.	No precipitate.	Dense, gelatinous precip.	Thickens it still more.	Copious gelatinous precip.
Acetate of lead after ammonia.	Abundant precipitate.	.....	Gelatinous precipitate.	Thick, gelatinous precip.	Gelatinous precipitate.
Concentrated sol. of ferric sulphate.	Gelatinizes.	.....	Gelatinizes.	Gelatinizes.	Gelatinizes.
Dilute solution of ferric sulphate.	Color darkened.	No precipitate.	Orange color.	Olive-green color.	Dark-green color.
Sodic silicate.	Causes thickening.	.....	Causes thickening.	Gelatinizes at once.	No change.
Ammonic oxalate.	White precipitate.	White cloud.	White precipitate.	White precipitate.	Dark precipitate.
Argentio nitrate.	No reaction.	.....	No reaction.	No reaction.	No reaction.
Ammonic chloride.	" "	.....	" "	" "	" "
Glycerin.	No change.	.....	No change.	No change.	No change.
Alkaline solution of copper.	No reaction.	No reduction.	No reaction.	No reaction.	Reduction to suboxide.
Iodine.	" "	No change.	" "	" "	No reaction.
Ninety-five per cent. alcohol.	Coagulates.	Precipitates white flocks.	Curdy precipitate.	Coagulates.	Coagulates.
Seventy-five " "	Curdy precipitate.	.....	" "	Curdy precipitate.	No effect.
Specific gravity.	1.492.	1.811.	1.487.	1.816.	1.528.
Specific gravity of solution, 1 part gum to 2 of water.	1.128.	.....	1.149.	1.186.	.....
Reaction.	Acid.	Acid.	Acid.	Acid.	Acid.

It will be observed, that Prof. Procter obtained no precipitate by ammonia added after subacetate of lead. This is most probably due to his solutions having been dilute, when no reaction occurs, while from the mixture of concentrated mucilage and strong solution of subacetate of lead, a very thick gelatinous precipitate is thrown down by ammonia. For all the experiments recorded in the above table, excepting Prof. Procter's, mucilages were used, made from one part gum to two of water.

Mezquite gum occurs in roundish pieces of various sizes, sometimes reaching an inch in diameter. A few of the smaller fragments are almost as light in color as the best variety of gum arabic, but by far the greater proportion is of every shade of orange and garnet down to dark amber. Like true gum arabic the tears exhibit numerous fissures, and when broken, they are prone to break into a multitude of fragments. A very handsome white powder can be procured from mezquite. The gum is entirely and freely soluble in water, yielding a clear transparent mucilage.

The above false mezquite averages a much darker, reddish-brown color, some of the pieces being almost the shade of Socotrine aloes. They are all clear and not fissured. Notwithstanding their dark color, they yield a tolerably white powder.

Dr. Edward Palmer, in a lengthy essay on Indian Foods, published in the Report of the Commissioner of Agriculture for 1870, shows the mezquite tree and its products to be of very great importance to many tribes of our western Indians. He states, that the buff-colored pods, attaining a length of from seven to nine inches, ripen in June, when they are chewed by both whites and Indians on their journeys. In taste they resemble the early harvest apple, having an agreeable blending of acidity and sweetness. They are not only nutritious, but are also found to be a preventive of thirst. The Indians are in the habit of bruising the ripe pods in a stone or wooden mortar, and mixing them with water in a rude earthen dish. After standing a few hours, a kind of cold porridge or mush is obtained. All present then seat

themselves on the ground around the newly prepared mess, and, using their hands as scoops, dip in without further ceremony, presenting a grotesque sight, such as is seldom witnessed outside of an Indian camp. The almost naked bodies of these Indians of every rank, age, and sex, soon become smeared from head to foot. The shaggy appearance of their hair is anything but suggestive of cleanliness, though it does not interfere with the development of a peculiar complaisant look on their dusky countenances. Their tumid abdomens soon begin to give proof of the quantity consumed.

When the fruit or bean-like pod is quite ripe, it is thoroughly dried, and then stored away for winter use. The Apaches, Primas, Maricopahs, Yumas, Yavapais, Mohaves, Hualipais, Cocopahs, and Moquis, of Arizona, besides many tribes in New Mexico, Utah, Nevada, and Southern California, regard them as great luxuries. The Indian women pound the dry pods until reduced to a fine powder; this is mixed with a little water, pressed into large thick cakes, weighing several pounds, and dried in the sun. When stored away in a coarsely pulverized or entire state, the pods soon become a living mass, as an insect of the species *Bruchus* issues from each seed. The Indians, however, do not scruple at this, but permit the larvæ to form a portion of their bread. When reduced to flour, a homogeneous mass of animal and vegetable substance is thus obtained. The flour is very sweet, so that a palatable gruel can be made from it, or an agreeable and refreshing drink when merely mixed with water. By boiling it in water and then allowing it to ferment, a pleasant and nutritious beverage is obtained, which is much esteemed by the Indians. There is said to be great suffering among the above-named tribes when the crop of mezquite beans fails. Excellent vinegar can also be prepared from the pods. The Indians of Arizona mix the gummy exudation of the tree with mud, and then smear it on their heads, for the double purpose of destroying insects and coloring their hair. Horses and cattle soon grow fat when fed on the pods. The women use mezquite bark to make skirts; they also twist the same material into rope or twine, and even weave it into baskets.



The flour is also used by the Pueblo Indians as an ingredient of their favorite dish, which they call *pinde*. Their women prepare this by parching wheat, pulverizing it with a flat stone in a very slightly concave mortar, termed a *metate*, and then mixing it with the flour of the mezquite beans.

PHILADELPHIA, July 18th, 1875.

## ON THE MANUFACTURE OF RUBBER FROM MILKWEED.\*

BY WILLIAM SAUNDERS.

For a year or two past operations have been carried on in our city (London, Ontario) with a view to establish the fact that an elastic, vulcanizable gum can be prepared from our common milkweed, *Asclepias cornuti*, at a cost which will enable the maker to compete successfully with imported rubber. It is not my purpose to attempt to prove that such a result has been accomplished, but to call your attention to an important process in the preparation of the weed by which the product is materially affected both in quantity and quality.

Some four years ago the advantages of this process were accidentally discovered. In the course of some experiments a quantity of the roots of this weed were collected, cut up, and placed in a heap with the intention of submitting them to the action of a solvent. Shortly the mass fermented, when it was observed that a change had occurred in consequence of the fermentation, the mass having become more sticky, and apparently richer in rubber. After-treatment showed the correctness of this supposition, and this process has been extended since to the treatment of other portions of the plant. The whole herb is now collected, and after being coarsely cut up is fermented in heaps for several days, then dried, ground, and placed in suitable vessels, where it is treated with bisul-

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\* Read at the sixth session

phide of carbon, which, after many experiments, has been shown to be the most satisfactory solvent yet tried. After sufficient maceration the liquid is drawn off into stills, and the bisulphide recovered by distillation. Such in brief is the process at present employed.

Wishing to test how far the previous fermentation of the weed affected the quality and quantity of the result, I procured some of the weed and submitted it to the action of bisulphide of carbon both in the unfermented and fermented state.

One pound of the unfermented weed, ground as finely as a Swift's drug-mill would grind it, was moistened with half a pint of the bisulphide, and quickly transferred to a covered glass percolator, where it remained for two or three days, when a further quantity of the menstruum was added, the resulting liquid being set aside in eight-ounce vials as obtained. The color, which in the first portion was deep yellowish-brown, became much paler after the third half pint had passed through, when, with a view to economize the solvent, water was added with the intention of displacing enough to make up the fourth half pint, but the material being rather coarse the water passed rapidly through and vitiated the result, so that only the first three portions were reserved.

The first half pint yielded on evaporation,	.	.	55 grains.
The second " " " "	.	.	27 "
The third " " " "	.	.	38 "

The larger yield of the third portion was, I think, due to the prolonged maceration of the coarse material, a little more time having been given to the maceration of the third portion than was allowed to the second.

The experiment was repeated with the following results: After allowing the moistened material to macerate for twenty-four hours, successive portions of the solvent were added until six half pints of liquid had been obtained without further maceration. After the first two had passed, the fluid became much lighter in color, being very pale yellow at

the last. The first three portions were evaporated, yielding respectively:

First half pint, . . . . .	50 grains.
Second half pint, . . . . .	30 "
Third half pint, . . . . .	18 "

The subsequent portions, with a view of hastening the evaporation, were placed on a hot stove, from which the fire had been removed. Through want of care on the part of an attendant the material took fire and could not be extinguished for some time, owing partly to the very inflammable character of the liquid itself, and partly to the unpleasantness of inhaling the dense fumes of sulphurous acid with which the room was charged.

With the fermented weed I had no mishap. Treated as in the first experiment mentioned—

The first half pint yielded, . . . . .	198 grains.
The second " " . . . . .	110 "
The third " " . . . . .	39 "
The fourth " " . . . . .	15 "
The fifth " " . . . . .	6 "
Total, . . . . .	368 "

(or a fraction under 5 per cent.)

In the second instance, when the previous maceration was only twenty-four hours:

The first half pint yielded, . . . . .	148 grains.
The second " " . . . . .	71 "
The third " " . . . . .	40 "
The fourth " " . . . . .	27 "
The fifth " " . . . . .	19 "
The sixth " " . . . . .	18 "
Total, . . . . .	313 "

The lessened yield in this case showing the advantage of a prolonged maceration.

The yield from the fermented weed differed materially in quality as well as quantity from that obtained from the unfermented; from the latter there resulted a brown or yellowish-brown extract of a greasy character, variable in appear-

ance, and with much less elasticity than in that resulting from the treatment of the fermented weed, the latter being of a green color, and possessed uniformly of highly elastic properties. This elastic gum is vulcanizable, and it is claimed by some who have used it to be superior for some purposes to the ordinary rubber of commerce, being tougher, and possessed of more elasticity.

I regret that the limited time at my disposal has prevented me from presenting a more complete report on this subject. Sufficient I think has been adduced to show that by the process of fermentation the rubber stored in the tissues of the plant is placed in a more favorable condition to be acted on by the solvent.

I think it highly probable that a larger yield than that I have given could be obtained by fermenting the plant in a finely ground state, and by powdering the resulting material before operating on it with the solvent. Should experiments on a large scale show that this material can be economically worked a new and useful branch of industry will be established, and a mass of hitherto almost worthless material utilized.

LONDON, ONTARIO, CANADA.

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### COD-LIVER OIL.\*

BY THOMAS E. O. MARVIN.

THE therapeutic properties of cod-liver oil have long been known to the medical practitioner. Pharmacentists are familiar with its chemical constituents, but the methods of obtaining the oil from the livers were for a long time very crude and unsatisfactory, no systematic effort being made by the fishermen to preserve the livers in good condition until the oil could be extracted.

The small proportion which the livers bear to the bulk of

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\* Read at the sixth session.

fish taken by a fisherman before the use of trawl-lines was resorted to, seemed to them not worth the time and attention the proper rendering of the oil daily would divert from the work of catching and marketing the fish. Therefore the livers were thrown carelessly into a butt exposed to the heat of the sun until the oil would be extracted by fermentation and putrefaction; the product being a dark-brown oil of a rank smell and acrid taste, fit only for use in currying coarse leather.

Another practice was to allow the livers to accumulate in casks until a stormy day interfered with the usual employment of the fishermen, when the whole mass of decaying livers and exuded oil would be thrown into huge caldrons, and boiled until the entire separation of the oil from the animal tissue was completed.

The oil thus obtained was of a light-brown color, and less repulsive than the first described, yet the stoutest stomachs would protest against and reject it.


Invalids, to whom the use of cod-liver oil was prescribed by physicians, being unable to take the kinds ordinarily supplied to the trade, frequently resorted to fishing stations along the coast of Maine and Nova Scotia, where they could get fresh codfish livers every day; those subjected to a hot water-bath would yield a sweet and pure oil easily taken, and assimilated without difficulty.

The trouble and expense attending this course was obviously an insuperable obstacle to its general adoption.

The undoubted efficacy of cod-liver oil as a remedy in scrofulous and pulmonary affections, induced several enterprising pharmacists in some of our seaboard cities to make special arrangements with influential men among the fishermen to take extra care in the preparation of oil for them.

Thus a limited supply of better quality was given to the market. But druggists could not rely upon the certainty of getting it uniformly of good quality.

The introduction of the use of ice as a means of preserving codfish for transportation fresh to the populous inland cities south and west during the catching season, from December to March, wonderfully developed the fishing business off the



coast of New Hampshire. Its only seaport, Portsmouth, having extraordinary railroad facilities for trade with Canada and the West, and being situated so near the ocean that its harbor is never frozen, has become a great resort of fishermen, who follow their hazardous avocation successfully in spite of the rigorous weather of winter. The vessels carry from ten to fifteen men each, and are provided with a number of small boats called dories. They leave the harbor every night when the weather will permit, shortly after midnight, for a cruise to the "fishing grounds," thirty miles off in the open sea, where each frail dory with two men leaves its respective vessel in charge of the skipper and cook. Rowing away for a mile or two, the men "set" their trawl-lines along the bottom of the sea, with two thousand baited hooks on each trawl, which are nearly a mile in length, with small anchors at each end, and marked along their course by floating buoys.

One man rows the boat as fast as he can, while the other "pays out" the line from the tubs in which it lies coiled, with hooks attached by short cords a fathom apart. As soon as the line is stretched out along the bottom of the sea, the men row to the buoy at the other end of the trawl, and draw it up with its weight of living fish. Each vessel hovers near its brood of boats until they are laden with fish and the recovered trawls, when they are taken on board one at a time. Afterwards the vessels sail away for home to sell their fish in time to be sent off on the night freight trains.

The entrails of the fish are removed on the way to port. The livers are taken out and put into clean baskets.

As soon as they are received from the fishermen on their arrival at the wharves, the livers are carefully cleansed, and immediately subjected to a process of slow and careful cooking by the gradual application of heat, which separates the oil from the animal tissue and aqueous matter, which subsides to the bottom.

The oil is then skimmed off and purified by filtration at a low temperature, and preserved in suitable vessels, and kept in a cool place.

## III. CHEMISTRY.

## MINERAL ACIDS.\*

BY P. W. BEDFORD.

QUERY 17.—Would it be advisable to decrease the specific gravities of some of the mineral acids of the Pharmacopœia which are supplied by manufacturers? It is alleged by some makers that such strong acids are not readily made, and that no advantage is derived from using them of such strength.

In a paper submitted to this Association at its meeting last year, the writer gave the results of an investigation of the mineral acids sold as chemically pure in the New York market. This paper gave the specific gravities of the acids examined, which proved that nearly every sample was deficient in strength, the nitric acid showing the greatest deficiency, sulphuric acid being near the required strength, while most of the hydrochloric was stronger than the United States Pharmacopœia standard. Further examinations during the past year show the same state of affairs.

The question to which this paper is but a partial reply is, practically, shall the standard of our Pharmacopœia be lowered to meet the supplies as found for sale, or shall we insist on the manufacturer furnishing an article which complies with the requirements of the Pharmacopœia?

There appears to be no good reason why sulphuric acid cannot be furnished of the specific gravity of 1.843 as readily as at 1.838; and it is not improbable that this slight deviation in strength is due rather to the differences and imperfections of the hydrometers used by the workmen in the factories, and to the absorption of hygrometric moisture during the handling of the acid, rather than any desire of the manufacturers to furnish an acid of deficient strength.

The only acid that appears to give much trouble is nitric, and manufacturers would rather furnish a weaker acid. The reasons assigned for this are the greater proportionate cost of the stronger acid, as well as the greater risk in transportation. The writer thinks, however, that these reasons are hardly

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\* Read at the sixth session.

sufficient, especially as the strong acid that is furnished must be nearly or quite as risky to transport, and the additional cost of manufacture cannot be very much greater.

Hydrochloric acid is to be found of full strength without difficulty, so that the question limits itself to sulphuric and nitric acids.

The formulas of the Pharmacopœia are based upon acids of a definite strength, and, while these cannot always be had without some difficulty, yet a change in the standard of specific gravity would involve labor and trouble in some of the formulas of the Pharmacopœia, and it is to be feared that even then the practical solution of the matter would not be at an end. Manufacturing chemists and careful manipulators will always make sure of the proper strength of their materials, and, if deficient, will calculate the amount needed; while the *average* pharmacist does not, and will not, take that trouble, and the latter, only too often, follow the formulas as they stand without any further inquiry as to specific gravity, strength, or tests of purity.

The German Pharmacopœia orders each of these three mineral acids of a lower specific gravity than does our Pharmacopœia; while the British Pharmacopœia is identical with our own in this respect.

The writer is of the opinion that it is *not* advisable to decrease the specific gravities of the mineral acids of the Pharmacopœias.

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## ON DILUTED PHOSPHORIC ACID.\*

BY LOUIS DOHME.

QUERY 37.—Can the contamination of pyrophosphoric acid be prevented in dilute phosphoric acid, when the latter is prepared from the glacial phosphoric acid of different manufacturers?

WHEN experimenting on the above subject a year ago, I set aside a number of properly labelled specimens of solutions

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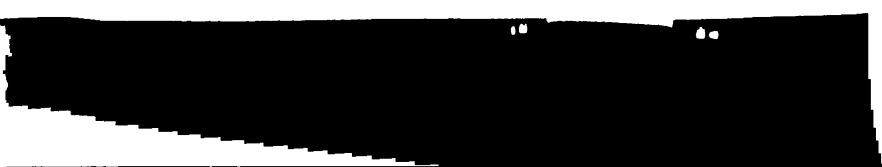
\* Read at the fourth session.



of glacial phosphoric acids, some of which had been heated with nitric acid according to the officinal process, others heated to different degrees of heat without addition of nitric acid, and still others which were merely solutions of glacial phosphoric acid of different densities, and which had not been heated at all. Before entering upon any further experiments, I examined these to find what effect time had exerted into converting the glacial acid into the tribasic acid. My experiments on the nature of the precipitate formed when some dilute phosphoric acids of commerce were mixed with tincture of chloride of iron, and which were published in the Proceedings of this Association last year, suggested the use of tincture of chloride of iron as a test for pyrophosphoric acid, or what was found to be a still more delicate test, a solution of the sublimed ferric chloride (ten grains to the fluid ounce of water). On adding this test to the different solutions of glacial acid, about twenty in all, I found that all had been converted into tribasic acid sufficiently to mix clear with tincture of chloride of iron, but on diluting the mixture with five or six times its bulk of water, a turbidity and finally a precipitate was caused, showing that some pyrophosphoric acid still remained in all the acids, either free or combined with sodium, the latter being invariably present in glacial phosphoric acid of commerce.

I now proceeded to experiment further with the different specimens of glacial phosphoric acid obtained. I learned from one of the leading American manufacturing chemists, that glacial phosphoric acid is not manufactured in this country, but that all which is bottled and sold by them and other manufacturing chemists is imported from Europe, principally from E. Merck, Darmstadt. I found two varieties in appearance, however, and made these the basis of my experiments: No. 1 is in cylindrical hard transparent sticks, No. 2, in irregularly broken transparent pieces.

Two troy ounces of acid No. 1 were dissolved in four fluid ounces of distilled water, and the solution was gradually heated to the boiling-point ( $220^{\circ}$  F.). The boiling having been continued at this temperature for some time, a small



specimen was taken out of the dish with a pipette and placed in the first of a series of numbered test-tubes. As on further concentration of the acid the boiling-point had gradually reached  $240^{\circ}$  F., another specimen was taken out and dropped into the second test-tube. The heating was continued, and as the boiling-point gradually rose, specimens were drawn at  $250^{\circ}$ ,  $260^{\circ}$ ,  $280^{\circ}$ ,  $300^{\circ}$ ,  $320^{\circ}$ ,  $350^{\circ}$ , and  $420^{\circ}$  F., and placed in the proper tubes. After diluting these specimens to about the strength of the officinal dilute phosphoric acid, the test solution of chloride of iron was applied by carefully pouring the acid into the iron solution until decolorized, with the following results: The specimens taken respectively at  $220^{\circ}$  and  $240^{\circ}$  F., gave a decidedly dense white precipitate. The precipitate gradually diminished in density in specimens taken at  $250^{\circ}$ ,  $260^{\circ}$ , until at  $280^{\circ}$  and  $300^{\circ}$  F., it had reached its minimum density, a gradual increase being again noticeable at  $320^{\circ}$ , more at  $350^{\circ}$ , and most at  $420^{\circ}$ , when the acid had apparently been almost entirely reduced to pyrophosphoric acid, forming a semi-solid white jelly with tincture of chloride of iron, giving a white precipitate with nitrate of silver, but producing no precipitate with albumen or chloride of barium, thus showing that no appreciable quantities of metaphosphoric acid had been formed.

This acid was again dissolved in four fluid ounces of distilled water, and was again boiled until the solution reached the boiling-point of  $420^{\circ}$  F., specimens being again drawn as before with precisely the same results. The specimens drawn at  $280^{\circ}$  and  $300^{\circ}$  F., at first mixed clear with tincture of iron, but the solution soon became opaque and turbid on standing a little while, or immediately on being diluted with five or six times its bulk of water. The two specimens of glacial acid gave the same results under the same experiments. One of the solutions was kept at the boiling temperature of  $280^{\circ}$  to  $300^{\circ}$  F. for two days (eighteen hours), the water being replenished in small portions as it evaporated, without any noticeable improvement in the condition of the acid in its behavior with tincture of chloride of iron.

The same series of experiments were repeated with two

ounces of glacial phosphoric acid with addition of the official quantity of nitric acid, but the results were apparently quite the same as before, when no nitric acid had been added.

A quantity of phosphoric acid was next prepared by the first official process by oxidizing phosphorus with nitric acid. This was concentrated to expel all the nitric acid, was then treated with sulphydric acid to remove the arsenic, filtered, and finally heated until the boiling-point reached  $450^{\circ}$  F., when a specimen taken out by a pipette and diluted with water gave a slight precipitate with tincture of chloride of iron. The acid was allowed to cool, being then of the consistence of thin syrup, and about half its bulk of distilled water was added, which caused considerable elevation of temperature in the acid. On testing a portion of it soon afterwards with tincture of iron, it was found that it again mixed clear. The acid was now placed in a platinum dish and heated to redness, part of the phosphoric acid being volatilized and passing off as white fumes at that temperature. The acid was allowed to cool, and congealed to a tough, semi-solid, transparent mass. This was again dissolved in water and was found to precipitate tincture of iron, also albumen and chloride of barium, showing that it had been converted into metaphosphoric acid. After standing over night the solution no longer precipitated chloride of barium, but gave a white precipitate with nitrate of silver, and a thick gelatinous precipitate with tincture of chloride of iron.

On concentrating the solution until the boiling-point reached  $280^{\circ}$  F., it had been entirely reconverted into tribasic acid, mixing perfectly clear with tincture of iron, the mixture remaining clear even when largely diluted with water, and gave a yellow precipitate with nitrate of silver and ammonia.

From the difference in the behavior of the metaphosphoric acid prepared as stated above, and that of the glacial phosphoric acid, I came to the conclusion that this difference must be due to the impurities contained in the glacial phosphoric acid, and accordingly the two varieties of the glacial phosphoric acid alluded to above were examined with the following results:

Sulphydic acid passed through the solution of the acids, and remaining in contact with it for twenty-four hours produced no precipitation in either one of the specimens, nor did Marsh's test reveal even traces of arsenic in them.

When saturated with ammonia in excess, No. 1 remained perfectly clear, whilst No. 2, showed a slight turbidity owing to very small quantities of the earths present.

100 grains of acid No. 1 were dissolved in water without application of heat, and found to neutralize 75 grains of crystallized bicarbonate of potassium, whilst No. 2 neutralized 80 grains of bicarbonate of potassium, showing at once that a considerable quantity of the phosphoric acid must exist in the glacial acid already saturated.

To determine the quantity of soda present, which had been found by various chemists as an impurity of the commercial glacial phosphoric acid, I followed the plan indicated by Professor Prescott in his report on the subject to this Association in 1872. A weighed quantity of the glacial acid was dissolved in distilled water, and carefully heated until a drop brought in contact with albumen on a watch-glass no longer produced a precipitate. The phosphoric acid was then precipitated with an excess of solution of subacetate of lead, the phosphate of lead separated by filtration, thoroughly washed, and the filtrate exposed to a current of sulphydic acid to remove the excess of lead. The sulphide of lead having been collected and washed on a filter, the filtrate was evaporated to dryness and ignited in a platinum crucible. The dark residue was exhausted with distilled water, and the filtrate again evaporated to dryness, ignited, and weighed as carbonate of sodium. This latter was found entirely free of phosphoric acid. Several analyses gave the following results:

	NaO,CO <sub>2</sub> in 100.	NaO in 100.
Acid No. 1, in sticks, . . . .	24.45	14.30
" " 2, in pieces, . . . .	25.60	14.97

It will thus be noticed that the acid in sticks contains 14.30 per cent. of NaO, which, if combined as metaphosphate, would represent 47.05 per cent. of metaphosphate of sodium, whilst

the acid No. 2, in pieces, contains 14.97 per cent. of  $\text{NaO}$ , capable of forming 49.25 of  $\text{NaO}, \text{PO}_3$ . Part of the phosphoric acid is no doubt united with two atoms of base forming pyrophosphate of sodium, which would lessen the quantity of salt and increase the proportion of free acid present. The other impurities, consisting of small portions of silica, magnesia, and lime, were not quantitatively determined, as this large proportion of soda was sufficient to make the glacial acid objectionable for the preparation of dilute phosphoric acid, and also sufficiently accounted for the difficulty in the conversion of the meta- and pyrophosphoric into the tribasic acid. To prove this fact 20 per cent. of pyrophosphate of sodium was added to the official dilute phosphoric acid, made from phosphorus, and although the acid was concentrated and heated to  $300^\circ \text{F.}$ , it still gave a precipitate with tincture of chloride of iron, whilst the official dilute phosphoric acid contaminated with 30 per cent. of orthophosphate of sodium mixed perfectly clear with tincture of iron, the mixture remaining clear even when diluted with five or six times its bulk of water.

To prove that free pyro- and metaphosphoric acids would form a precipitate with solution of chloride of iron, I repeated some of my experiments of last year by preparing some phosphoric anhydride by burning phosphorus in a dry atmosphere under a bell-glass. The solution of this anhydride in water ( $\text{PO}_3\text{HO}$ ), and diluted to about the strength of the official diluted acid, produced a dense gelatinous precipitate with tincture of iron. When this acid, after standing for a few days, no longer precipitated albumen or chloride of barium, but gave a white precipitate with nitrate of silver, thus showing that the metaphosphoric acid had disappeared, it still continued to produce a dense precipitate with tincture of iron.

The same effect on tincture of iron was also produced by diluted pyrophosphoric acid, prepared by decomposing pyrophosphate of barium with sulphuric acid.

Thus it is the pyrophosphoric acid, and probably a little metaphosphoric acid, either free or combined with sodium, which cause the precipitate in dilute phosphoric acid, pre-

pared by boiling the glacial acid with water, when the former is mixed with tincture of iron.

From the foregoing experiments I come to the conclusion that the contamination of pyrophosphoric acid cannot be prevented in dilute phosphoric acid, prepared by boiling glacial phosphoric acid of commerce with water, with or without nitric acid, at least in any practicable length of time, whilst the presence of so large a proportion of soda in the glacial phosphoric acid is also objectionable, as a large percentage of the acid would necessarily be present in the diluted phosphoric acid as phosphate of sodium, even if the conversion of meta- and pyrophosphoric acids into tribasic could be complete. Thus 100 grains of the officinal dilute phosphoric acid made from the glacial acid by boiling with water, neutralized only 13 and sometimes 14 grains of crystallized bicarbonate of potassium, whilst its specific gravity was 1.062, a little higher than the specific gravity of the officinal dilute phosphoric acid made from phosphorus, which neutralizes 23.4 bicarbonate of potassium for every 100 grains of the acid. But this difference is not altogether due to the presence of phosphate of sodium, and the but partial conversion of the monohydric into the tribasic acid, as will appear from the following comparison of the two officinal formulas:

Three hundred and sixty grains of phosphorus, when oxidized by nitric acid, yield 1138.06 grains of tribasic phosphoric acid ( $\text{PO}_3, 3\text{HO}$ ), which, divided by 20, gives 56.9 grains of the acid to each fluid ounce of the officinal dilute phosphoric acid, or 11.88 grains to 100 grains of dilute acid capable of neutralizing 23.4 grains crystallized bicarbonate of potassium.

In the second officinal process 1 troy ounce of glacial acid is ordered to be dissolved in sufficient water to finally make 12.5 fluid ounces of dilute phosphoric acid. By dividing 480 grains of acid by 12.5, we obtain 38.4 grains of supposed metaphosphoric acid to the fluid ounce, which, if it were pure metaphosphoric acid, and were completely converted by boiling into tribasic phosphoric acid, could only yield 47.04 grains of the latter to the fluid ounce, or 9.78 grains in 100 grains of

diluted phosphoric acid capable of neutralizing 19.98 grains of crystallized bicarbonate of potassium, thus yielding a much weaker acid than the dilute phosphoric acid prepared from phosphorus by the first officinal process.

As it is, therefore, desirable that the acid should be prepared by the latter process, I add a few suggestions in regard to the officinal formula. In preparing the acid by this formula, I found it invariably necessary to add more nitric acid, from half to one fluid ounce of strong nitric acid properly diluted, to effect the complete oxidation of the phosphorus into phosphoric acid. This was no doubt caused by loss of the acid by evaporation through the neck of the funnel, which should, on that account, be stopped with a loosely fitting glass stopper, which not only prevents the escape of nitric acid, but also that of phosphoric acid, which is constantly forming in dense white fumes on the surface of the liquid by the burning of small globules of phosphorus rising to the surface of the liquid. In operating on larger quantities particularly, I know of no better plan than that originally proposed by Mr. George W. Andrews, of Baltimore, of covering the ingredients contained in a dish with an inverted smaller dish, placing the whole on a water-bath, and heating for several hours. The inverted dish prevents the escape of the acids, and offers greater safety to the operator.

The presence of arsenic in phosphorus, and the consequent contamination of the dilute phosphoric acid with arsenic acid, should also receive attention in the officinal formula. Mr. Littleton Thompson, in an article on phosphoric acid, published in the *Pharmacist*, May, 1874, found considerable arsenic in several specimens of dilute phosphoric acid, and I have never examined a specimen of commercial phosphorus which was entirely free of it. I have obtained as much as 14 grains of sulphide of arsenic from 360 grains of phosphorus, the quantity used for making 20 fluid ounces of dilute phosphoric acid. The officinal formula should therefore be amended by ordering that a stream of sulphydric acid should be passed through the phosphoric acid for some time, and allowing the acid to stand saturated with the gas for 24 hours before filter-

ing off the sulphide of arsenic, expelling the gas by heating and diluting the acid to the proper specific gravity.\*

BALTIMORE, August, 1876.

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## ACIDUM PHOSPHORICUM DILUTUM.†

BY JOSEPH P. REMINGTON.

THIS interesting chemical solution has been the subject of a good deal of research, and its proper preparation has engaged the attention of many pharmacists since its introduction as a remedial agent.

The Pharmacopœia of the United States of 1860 was the first authority, issued in this country, which recognized the value of the preparation sufficiently to prescribe a formula for it, the London Pharmacopœia having adopted it previously, and containing a process based on the oxidation of phosphorus by means of nitric acid.

Our authority furnishes two processes. At present it gives but one set of tests, and hence infers that an identical preparation is secured by either formula.

They are briefly: 1st. The conversion of phosphorus into phosphoric acid, through the oxidizing influence of nitric acid; and 2d. By dissolving glacial or metaphosphoric acid in water, and by boiling, with the assistance of nitric acid, the glacial acid is converted into ortho- or common phosphoric acid, sufficient water being added in both instances to produce a diluted phosphoric acid of definite strength.

On account of the greater difficulty, a disinclination on the part of pharmacists generally to handle phosphorus, and a timidity caused by some of the text-books mentioning the

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\* As one of the tests for the purity of the officinal diluted phosphoric acid, it might also be named that the acid should produce no precipitate with tincture of chloride of iron to prove the absence of meta- and pyrophosphoric acids.

† Read at the fourth session.




word explosion on the same page, and the greater simplicity of the second process, it has been the almost uniform practice to make diluted phosphoric acid from the glacial acid with those who pretend to manufacture preparations at all; whilst those unfortunates who have neither sufficient temerity or industry to make even as simple a preparation as this were no better off, for the manufacturing chemist or wholesale druggist, on whom they relied, almost to a unit made the diluted acid from the second process.

The writer has also been in the habit, until within a year or so past, of using this glacial formula, and would have continued in the practice, if the fact had not accidentally developed that a dense precipitate was apt to occur on mixing the acid with the official tincture of chloride of iron. (Amer. Jour. Phar., 1873, p. 522.)

As this mixture was one frequently desired by physicians sending to my store, it was the source of considerable annoyance, and, if possible, it was desirable to prevent the occurrence. On mentioning the subject to the chairman of the Committee on Papers and Queries, two years ago, it was suggested that it would make a proper subject for a query. This was done, and the valuable paper contributed to the Association last year by Louis Dohme, of Baltimore, was the result. In this paper the author clearly proved that the precipitate was pyrophosphate of iron, and that it was produced from a mixture of the solution made from *glacial* acid with tincture of the chloride of iron. He states "that he made numerous experiments to determine whether the contamination (*i. e.*, of pyrophosphoric acid) could be prevented, but the results, in carefully repeating the same experiments with specimens of glacial phosphoric acid from different sources, were so variable, that he is not prepared to report definitely on this point, but intended to follow up the subject and report at a future meeting."

Now it happened that the writer, during the last year, found the call imperative to ascertain, if possible, the *cause* of this precipitation, and the following experiments are detailed with the view of adding to the knowledge on this subject.



Starting with the investigation into the quality of the glacial phosphoric acid itself, as it was furnished in commerce, it did not require much looking into before the discovery was made that it is *all adulterated*, and that to no trifling extent.

In a paper read before this Association in Cleveland, in 1872, Prof. A. B. Prescott detailed the results of his examination of six samples of glacial phosphoric acid obtained from different sources, and in each one soda was found, although he does not consider that it was in sufficient amount to attract particular attention.

Believing that this habit of adding soda might still be in vogue, two or three samples of commercial acid were procured, and a solution made of each. When a drop of a solution from either of these was placed on platinum-foil, and held in the blue flame of a Bunsen burner, a very decided "sodium spectre" flashed in sight, whilst a drop of a solution of phosphoric acid, made from phosphorus, gave a very different coloration.

A quantitative estimation of one of the handsomest specimens was now made to determine the amount of the adulteration.

Two grams of the glacial acid were dissolved in thirty cubic centimetres of distilled water; and, having prepared a solution of pure plumbic acetate, a sufficient quantity of the latter was added to leave a slight excess remaining in the mixture.

A precipitate at once occurred, which was thrown on a filter, and thoroughly washed with distilled water. The filtrate and washings were collected, and sulphydric acid passed through, until the lead had been all precipitated as sulphide.

It was then filtered, the filtrate carefully evaporated to dryness, and ignited in a platinum crucible. The residue weighed .423 grams; and, considered as sodium carbonate, would be equivalent to .407 grams sodium metaphosphate, in which state the salt no doubt exists in the glacial acid.

This would show 20.35 per cent. of sodium present; or, in

other words, the glacial acid considered to be contained but 79.65 per cent. of pure acid.

The United States Pharmacopœia defines *acidum phosphoricum glaciale* "to be in colorless, transparent masses, slowly deliquescent in the air, and soluble in water and in alcohol.

"Its aqueous solution is not precipitated by hydrochloric acid, and no precipitate takes place after the liquid is left for forty-eight hours. Chloride of barium causes no precipitate, which is readily dissolved by another acid.

"Ammonia in excess produces but a slight turbidity; caustic potassa in excess evolves no ammonia."

Now how does the best glacial acid, obtainable from reliable sources, answer these requirements?

As to the first, there is no difficulty in buying colorless, transparent, glasslike masses so described; but the writer has repeatedly tried to get acid in these masses by evaporating the acid mass in phosphorus in glass, porcelain, or platinum vessel, but get, in any instance, any result, but a semi-solid which would not retain its consistence, if exposed to the air a day, and soon assumed a liquid form, and is not called a practical commercial preparation, or of use in medicine.

Desiring further information on this point a year or two ago, I wrote to a prominent manufacturing chemist, and he told me that years ago, when the acid was first imported, there was a difficulty in getting acid that would stand. After getting it out, and putting it up into small bottles, it would gradually liquefy, and become very unsightly and useless, so that this difficulty had been rather suddenly conquered, and that of late years there had been no trouble whatever.

It came out from Germany now in colorless masses, either in cakes or nicely fused into thin sheets, which were very convenient for putting up into small bottles. I further intimated that the *lapis philosophorum*

was soda, that the makers did not seem to be afflicted with any particular scruples in the matter either, as to the amount of the addition, but if 20 per cent. of soda would not stiffen the acid into rods thirty most likely would do it, and *thirty went in*.

Having thus obtained from one who practically handled large quantities of the acid confirming proof of the adulteration, chemical literature was searched to some extent to see if the fact had been noted abroad, when the following information from Watts's Dictionary, by Bressius (to be found in Zeitschrift Anal. Chem., vi, 187) turned up. "In the purest so-called glacial phosphoric acid of commerce he found 15.3 per cent. of soda, and he finds that really pure phosphoric acid forms only a soft glutinous mass."

So that from this we have reason to believe that the adulterated article is not all exported for American consumption, but that soda exists in the *purest* commercial article used in Germany to the extent of 15 per cent. This percentage no doubt represents the smallest amount that will serve the purpose of keeping the acid from assuming that glutinous consistence so fatal to commercial interests.

With regard to the other impurities that are liable to occur, such as the presence of metals, ammonia, lime, silica, etc., etc., the application of the pharmacopœial tests produced but negative or trifling results, except as to showing considerable traces of metals.

With regard to solubility, it is but slowly soluble in water, even at a boiling temperature, and almost insoluble in alcohol.

On making the acid. phosphoric. dil. from the second process of the Pharmacopœia, with glacial acid, the first point of variance from the standard in the finished product that was noticed was in specific gravity.

According to the footnote this should be 1.056, whereas, on carefully taking it with an accurate bottle, it stood at 1.060.

Desiring to know how it compared with the specific gravity of the diluted acid made from phosphorus three separate portions were made, strictly according to the Pharmacopœia,

without loss, when they gave respectively the figures 1.048, 1.048, 1.0487. Care was taken to deprive the solution in each case of excess of nitric acid, and the proper temperature, of course, was observed.

On pushing comparisons still further a great difference in saturating power was observed. One hundred grams of the acid made from phosphorus required twenty-three grams and eight decigrams of bicarbonate of potassium to saturate it, whilst one hundred grams of the diluted acid made from glacial acid was satisfied with seventeen grams and nine decigrams.

The question now arose: What effect has the presence of sodium in the glacial acid on tincture of chloride of iron?

To throw some light on this subject the following experiments were instituted:

I. To ten cubic centimetres of the diluted glacial acid was added gradually four cubic centimetres of tincture of chloride of iron, which occasioned a gelatinous precipitate, which increased rapidly in density until an equal portion had been added, when the precipitate seemed to cease, leaving a yellowish-colored liquid in which the precipitate was suspended.

II. Ten cubic centimetres of the diluted acid, made from phosphorus, yielded no precipitate with tincture of chloride of iron under any circumstances in any proportion.

III. To ten cubic centimetres of the same freshly prepared diluted acid, made from phosphorus, one cubic centimetre of solution of sodium hydrate was added. This was followed by four or five cubic centimetres of tincture of chloride of iron, when a precipitate closely resembling the former immediately took place.

IV. One hundred cubic centimetres of acid, made from phosphorus, was evaporated in a platinum vessel until a thick, gelatinous mass resulted. This was diluted with distilled water until it measured one hundred cubic centimetres, the original measure; the solution was then boiled. To ten cubic centimetres of this solution four cubic centimetres of tincture of chloride of iron were added, without producing any precipitate.

V. One hundred cubic centimetres of acid, made from phosphorus, was evaporated in a platinum vessel until a thick, gelatinous mass remained. A portion of this was placed in a test-tube, and a small quantity of distilled water added. Four cubic centimetres of tincture of chloride of iron dropped into this liquid produced a precipitate.

VI. To a portion of the precipitate from Experiment I, which had been thoroughly washed, a neutral solution of citrate of ammonium was added, slightly heated, when the characteristic apple-green solution of the officinal pyrophosphate of iron was developed.

These experiments, in addition to those made by Mr. Dohme, leave no room for doubt that the precipitate, caused by adding tincture of chloride of iron to diluted phosphoric acid (made from the glacial acid), is ferric pyrophosphate.

Experiment II points to the fact that to be made secure from the disagreeable result of the formation of the gelatinous precipitate, the acid made from phosphorus should only be used, and the amount of pyrophosphoric acid remaining in the diluted acid made from phosphorus, after it has been subjected to the boiling process as directed by the Pharmacopœia, is not sufficient to produce a precipitate with tincture of chloride of iron.

In the second process, where glacial acid containing soda is used, the soda exists there in combination, as metaphosphate and pyrophosphate, and this combination does not readily change, as the free acids do in process of time, to the common or tribasic acid. Hence, when tincture of chloride of iron is added, ferric pyrophosphate precipitates, and sodium chloride remains in solution.

Whilst the conclusion of this subject was a matter of some interest to the writer, there were several points of greater moment developed in the course of the inquiry, such as the difference in the specific gravities of the officinal acids (for they must now be regarded as *two*), the deficiency in strength of the glacial acid, etc., and these are such as to require immediate attention.

The situation can be summed up briefly in this manner.

1st. Diluted phosphoric acid cannot be made, according to the second process of the Pharmacopœia, and possess all of the qualifications required by the note at the bottom of the formula, in the present condition of the article as found in the market.

2d. If glacial acid can be had, as a commercial product, in a state of purity, then the definition in the list of the Pharmacopœia should be corrected in the statement that it occurs in transparent, colorless, glasslike masses; and the note should contain some test to detect the presence of soda.

3d. The quantity of distilled water should be reduced in the first official process, or the quantity of phosphorus increased, so as to produce an acid having the specific gravity of 1.056.

The best substance for the glacial acid that can be suggested is a thick, syrupy acid, having a definite specific gravity which could be diluted readily to the required strength.

PHILADELPHIA, Eighth month 26th, 1875.

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## ON A NEW METHOD OF PREPARING PHOSPHORIC ACID.\*

BY PROF. G. F. H. MARKOE.

THE preparation of pure phosphoric acid by the action of boiling dilute nitric acid, is one of the most tedious and unsatisfactory processes that the pharmaceutical chemist is called upon to execute, and the difficulty and danger connected with manipulations involving the employment of phosphorus, are too well known to require more than a passing allusion at this time. During the past ten years I have prepared not less than 1000 pounds of dilute phosphoric acid, and during all that time I have been seeking for some better way of pre-

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\* Read at the fourth session.

paring the acid than by the old method. I have tried nearly every modification of the officinal process that has been suggested, yet none afforded means by which to relieve the operator from the tedious watching and constant attention absolutely necessary to prevent an explosion, or at best to prevent the loss of materials and the breakage of apparatus.

When concentrated nitric acid is added to phosphorus, and the temperature prevented from rising by keeping the containing vessel in cold water, very little action takes place; if heat is applied the reaction rapidly increases and soon becomes so violent that an explosion will be the result. If the nitric acid be diluted with water, the action becomes less and less active, just in proportion to the quantity of water; if the proportions of the latter are at all large, the application of heat will be required. I have been as well pleased with the proportions suggested by Prof. C. L. Diehl in a paper presented to this Association in 1866.

I will not weary the members of this Association with a review of the many papers that have been written on this subject, but will at once proceed to lay before you a process for preparing phosphoric acid, which so far as my knowledge extends, is quite new, and by which the acid can be prepared in large quantities, with far less danger and with a much less expenditure of time than by any other practical process known to me:

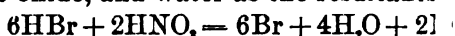
Take of Phosphorus,	. . . . .	1 part.
Nitric acid (sp. gr. 1.42),	. . . . .	6 parts.
Water,	. . . . .	1 part.
Bromine or Hydrobromic Acid,	a sufficient quantity.	

Put the phosphorus and the nitric acid into a glass flask, holding at least double the amount of all the materials; place in the neck of the flask a glass funnel, and invert a smaller funnel over the first one; pour into the flask a few drops of bromine or some hydrobromic acid, and when the reaction has fairly started, place the flask in a pan of water, and let the reaction go on in such way that the two funnels shall not get hot; when the reaction slackens it may be quickened by taking the flask out of the water and letting the temperature



increase. The addition of a few grains of materials is a practical advantage.

The novelty of this process is the employment of iodine, or the two jointly in connection with nitric acid, and the reactions that take place. The bromine first combines with the phosphorus to form the pentabromide of phosphorus ( $\text{PBr}_5$ ), this compound is decomposed by the water present into phosphoric acid and hydrobromic acid,  $\text{PBr}_5 + 4\text{H}_2\text{O} = \text{H}_3\text{PO}_4 + 5\text{HBr}$ . The hydrobromic acid produced by this reaction is decomposed as fast as formed by the nitric acid, giving bromine, nitric oxide, and water as the resultants.



The free bromine again forms pentabromide of phosphorus, which in turn is decomposed by water into phosphoric acid and hydrobromic acid, and the hydrobromic acid is reduced by the nitric acid as already explained. It is seen, then, that a very small quantity of bromine being used over and over again, transforms a quantity of phosphorus into phosphoric acid by employing the process suggested. That the process is quite practical is apparent from the fact that I have within the last few days made about ten pounds of phosphorus into phosphoric acid, and I submit the specimen of some thirty per cent. solution (sp. gr. 1.350) of phosphoric acid as evidence that my process is practically as well as theoretically correct. I may say, however, that the process is on paper before a single experiment was made, and I am sure that many excellent practical working processes may be devised by a close study of the reactions that are brought about between even those elements as to which we know the most.

After all the phosphorus has been dissolved, the only thing needed to finish the process is to transfer the contents of the flask into a porcelain evaporating-dish, and to add an excess of nitric acid, and then to dilute the syrupy solution with distilled water to any desired extent. I am in the habit of keeping in stock a solution containing fifty per

nary tribasic or orthophosphoric acid ( $H_3PO_4$ ), one part of which with four parts (by weight) of water, gives an acid corresponding with the officinal dilute phosphoric acid.

I find that by using iodine in connection with the bromine, the process goes on better than when either of these elements are used alone, probably because bromide of iodine is formed, which is soluble in water. Iodine forms with the phosphorus teriodide of phosphorus, which is decomposed as fast as formed by water into phosphoric acid and hydriodic acid, and the hydriodic acid is in turn decomposed as soon as formed by the nitric acid into free iodine, precisely in the same way that hydrobromic acid is under like conditions. The small portions of bromine and iodine remaining at the end of the first part of the process are both driven off by the heat employed in getting rid of the excess of nitric acid.

#### ADDITIONAL NOTES TO THE ABOVE PAPER.

A serious accident having occurred by which a member of this Association was injured while trying my process for making diluted phosphoric acid, it seems proper that I should add some further information as to the precautions that should be always observed in the management of the process. When the nitric acid is concentrated, or only diluted to a small extent, six parts of acid to one part of water, as given in the original formula, it is necessary that a sharp lookout be kept not to let the temperature rise high enough to melt the phosphorus, as it will soon do, unless the flask be put into cold water. Concentrated nitric acid *will not rapidly act upon phosphorus* in the cold; and, if ice is used, the reaction can be so far checked as to be practically of no account. Bromine can be added *by drops* to phosphorus in the presence of cold nitric acid, without any danger whatever, to a far greater extent than it is ever needful to employ it in this process. If phosphorus is put into strong nitric acid, and the reaction allowed to fairly get under way, and then bromine is rapidly added, the shock of the violent reaction between the phosphorus and the bromine may determine the violent explosion of all the materials present. I believe the character of such

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an explosion to be more like the explosion of gun-cotton by means of a detonating fuse of mercury, than the production of bromide of nitrogen suggested by Prof. Maisch.\* I have made many experiments with my process, using strong nitric acid, and adding bromine by drops to the phosphorus, in the presence of the nitric acid, and have never had any trouble, and used quantities of phosphorus, etc., like the following:

Phosphorus,	.	.	.	.	.	.	16	tro
Nitric Acid,	.	.	.	.	.	.	96	"
Water,	.	.	.	.	.	.	16	"
Bromine,	.	.	.	.	.	.	1	flui
Iodine,	.	.	.	.	.	.	15	gra

. In order to avoid the shock produced by the action of bromine with phosphorus in presence of nitric acid, add the bromine and iodine to the phosphorus in water, and then add the nitric acid. I will now come to one point which is of much importance, viz. it requires but very little more bromine or iodine to produce an action between large quantities of phosphorus and nitric acid in the cold, than it does where only one or two grains of phosphorus are used.

When hydrobromic acid is used in place of bromine, it may be added at once to the phosphorus and nitric acid, as being in a solid condition, reacts with much less solid phosphorus than bromine, and therefore it takes from ten to twenty grains of iodine to phosphorus and nitric acid needs no special caution. In general, the larger the proportion of bromine used, and the higher the degree of heat, the more rapid the reaction; and contrary if we employ a diluted nitric acid, a small quantity of bromine, and keep the temperature low, we can regulate the rapidity of the process at will. I will give the details of my experiments, out of a large number, which will

\* See Amer. Jour. Pharmacy, 1875, p. 525.—ED.

modifications of the process, which seem to me to danger of explosion out of the question.

*No. 1.*

Phosphorus, . . . . .	16 troy ounce
Nitric acid (specific gravity 1.42), . . . . .	96 " "
Water, . . . . .	96 " "
Bromine, . . . . .	1 fluid drachm
Iodine, . . . . .	15 grains.

The iodine was dissolved in the bromine, and the mixture was added to and shaken with the water, until dissolved in a two-gallon bottle. The phosphorus was then added, then the nitric acid; and, lastly, the glass funnels were put in position in the neck of the bottle, and the whole apparatus set into a large stoneware basin. At the end of one hour the reaction was progressing very slowly, and to quicken it a gallon of hot water was poured into the basin, and soon increased the action. Nothing more was done but to remove the water when it had become cool. At the end of forty-eight hours the phosphorus had all dissolved.

*No. 2.*

Phosphorus, . . . . .	8 troy ounce
Nitric Acid (specific gravity 1.42), . . . . .	48 " "
Water, . . . . .	24 " "
Bromine, . . . . .	1 fluid drachm
Iodine, . . . . .	15 grains.

The water and phosphorus were put into a ten-pint bottle, the bromine added by drops, then the iodine, and then the nitric acid, the funnels adjusted, and the apparatus put into a basin. The reaction began slowly; and, at the end of one hour, had increased so that the flask was quite warm. A half gallon of water, 45° F., was poured into the basin, and was at about 9 P.M. On the succeeding morning the reaction was going on slowly, and the water was removed about the flask, and the process allowed to go on without further interference during the day, and in about two hours from the start the phosphorus had all dissolved.

a few floating pieces. No attempt was made to hasten the process in these experiments (except to get No. 1 fairly started), which could have been easily done by the application of a very gentle heat. Among my earlier experiments it will perhaps be well to mention the following: It is well known that phosphorus forms with chlorine two compounds, the trichloride and the pentachloride of phosphorus. These compounds decompose in the presence of water, the trichloride into hydrochloric and phosphorous acids,  $\text{PCl}_3 + 3\text{H}_2\text{O} = 3\text{HCl} + \text{H}_3\text{PO}_3$ ; and the pentachloride into hydrochloric and phosphoric acids,  $\text{PCl}_5 + 4\text{H}_2\text{O} = \text{H}_3\text{PO}_4 + 5\text{HCl}$ . From this I reasoned that phosphoric acid might be made by dissolving phosphorus in nitrohydrochloric acid which contained free chlorine, and hence would form these compounds. I made trials with aqua regia alone, but did not find the result practically satisfactory, being very slow. By the addition of a little bromine or iodine the process went on well in the cold, but it did not work any better than in the trials where the nitric acid was diluted with water to the same extent as it has to be with hydrochloric acid in forming aqua regia. The hydrochloric acid was therefore practically wasted. I notice that Attfield recommends the employment of two funnels for condensers in the making of dilute phosphoric acid. I do not know who first suggested it, but I had used the device years before Attfield's Chemistry was published, and, so far as I am concerned, devised the arrangement for myself. I only mention this because it has been hinted that I have not given Prof. Attfield credit for the idea. I gladly confess myself debtor to Prof. Attfield for many valuable notions, but not for this one.

I will add one more working formula, which is well adapted for the use of those who only want to make small quantities of dilute phosphoric acid:

Take of Phosphorus,	. . . . .	2 troy ounces.
Nitric acid, sp. gr. 1.42,	. . . . .	12 " "
Water,	. . . . .	12 " "
Bromine,	. . . . .	40 to 60 grains.
Iodine,	. . . . .	10 grains.

Into a flask (or stone jar) having double the capacity of the materials used, place the water and phosphorus, then the iodine, and afterwards the bromine *by drops*; when the reaction has ceased add the nitric acid, adjust a glass funnel to the neck of the flask, and insert a smaller one over it; place the apparatus in a stoneware dish, and surround the flask or jar with cold water to about the same level as the liquid in the flask, and allow the process to go on for about twenty-four hours, when, if all the phosphorus has not been dissolved, heat may be applied to dissolve it. When the solution is complete, transfer the contents of the flask to a porcelain dish, and apply heat to get rid of the excess of nitric acid, the bromine and iodine. To accomplish this will require a heat of about 400° F. before all the nitric acid is expelled. Syrupy phosphoric acid at the above-named temperature will dissolve the glazing from the best porcelain dishes; but this is of not much practical consequence, inasmuch as the silica will all precipitate on the dilution of the acid. The acid resulting from the above formula may then be diluted with distilled water till it has the specific gravity of 1.350, when the solution will contain 50 per cent. of ordinary phosphoric acid ( $H_3PO_4$ ), and therefore will be just five times stronger than the officinal diluted phosphoric acid, specific gravity 1.056 — 10 per cent. ( $H_3PO_4$ ). Such a concentrated solution of phosphoric acid is very usefully employed in the making of such preparations as the syrup of the phosphates of iron, quinia, and strychnia; compound syrup of the phosphates of iron, calcium, sodium, and potassium, etc. The officinal diluted phosphoric acid can, of course, be very easily made from the concentrated acid by simply diluting one part of the 50 per cent. solution with four parts (both by weight) of distilled water. During the discussion that followed the reading of the original paper, at the Boston meeting of this Association, the question was raised as to the presence of arsenic in American phosphorus. Since then I have examined the subject, and the sample of phosphorus which I examined, made in New Jersey, did contain arsenic. From a lot of phosphoric acid representing 4000 grams of phosphorus I obtained by treatment with sulphy-

dric acid a quantity of sulphide of arsenic equal to 0.600 gram of arsenious acid, or rather arsenious anhydride. This is certainly a very small percentage of arsenic, only 0.150 of a part of arsenious acid in 1000 parts of phosphorus. But it is by no means a sure thing that all samples of phosphorus would contain so small a portion of arsenic, and the removal of arsenic from phosphoric acid, by means of sulphydric acid, should be required by the United States Pharmacopœia. In the process which I have proposed for making phosphoric acid, there is a large excess of nitric acid used, and purposely so. The formation of bromide or of iodide of nitrogen in the presence of free nitric acid is not possible, therefore no danger need be feared by explosions resulting from the production of these dangerous explosives. If after all the phosphorus has been dissolved in either of the formulas which I have given, more phosphorus be added it will slowly dissolve, and where close economy of materials is necessary, as it would be in a manufacturing establishment, it would be perhaps well to push the process to its limits. I have found, however, that where an excess of phosphorus is used, and the process is continued until all action on the phosphorus has ceased, that there is produced under these circumstances a large proportion of *phosphorous* acid. On the evaporation of a mixture of phosphoric and phosphorous acid down to a syrup, a strong garlic-like odor is given off, accompanied with little flashes of light all over the surface of the thick, hot liquid in the evaporating-dish. This is due to the decomposition of the phosphorous acid into phosphide of hydrogen (which takes fire spontaneously), and into phosphoric acid, and if arsenic acid be present it will be reduced by the phosphorous acid, first, to arsenious acid, and finally into metallic arsenic, which will show itself as a black powder floating about the contents of the dish. In order to avoid this result, a certain excess of nitric acid is necessary. It need hardly be added that the use of nitric acid specific gravity 1.420 is not necessary; weaker acids, which can be more easily obtained in the market, will do just as well if employed in portions equivalent to the quantities of the officinal nitric acid called for in the formulas.

Boston, November, 1875.



## NOTE ON HYDROBROMIC ACID.\*

BY PROF. GEORGE F. H. MARKOE.

IN the Proceedings of the American Pharmaceutical Association, vol. ix (1860), p. 220, Prof. J. M. Maisch gives an excellent working process for preparing aqueous hydrobromic acid, being a modification of the original process suggested by Balard, in which the hydrobromic acid is produced by the action of bromine on phosphorus in the presence of water. When phosphorus and bromine are brought in contact, in the presence of a sufficient amount of water, the following reactions take place: The bromine and phosphorus first unite, forming pentabromide of phosphorus,  $\text{PBr}_5$ , and then each molecule of pentabromide of phosphorus reacts with the elements of four molecules of water,  $\text{H}_2\text{O}$ , forming one molecule of phosphoric acid,  $\text{H}_3\text{PO}_4$ , and five molecules of hydrobromic acid,  $\text{HBr}$ , as represented in the following equation:  $\text{PBr}_5 + 4\text{H}_2\text{O} = \text{H}_3\text{PO}_4 + 5\text{HBr}$ .

Prof. Maisch used a somewhat complicated apparatus, which is minutely described by him in the paper to which I have already alluded.

During the past year I have had occasion to prepare considerable quantities of hydrobromic acid, and having been successful in its manufacture with the employment of very simple apparatus, and the observance of a few precautions which require very little manipulatory skill, I thought the subject might be of enough interest to claim the attention of the members of this Association.

Prof. Maisch uses equivalent proportions of phosphorus and bromine, nearly, that is one (1) part of phosphorus, and twelve and one-half parts of bromine (12.5). The phosphorus being placed in a retort containing six or eight parts of water, and the bromine very gradually added, and in order to prevent the loss of hydrobromic acid and bromine consequent on the large amount of heat developed by the reactions, the retort, with beak pointing upwards, is connected with two condensers kept cold with ice. I use a very large excess of phosphorus,

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\* Read at the fourth session.



two or three times more than will be required to transform the bromine into hydrobromic acid, and thus greatly shorten the time required to complete the process. The apparatus I have used consists of an ordinary stoneware jar (such as carbonate of ammonium is usually sold in) at least of twice the capacity of the total amount of all the materials employed, an ordinary glass funnel, and a funnel-tube of appropriate length, and is all the apparatus really necessary, the funnel-tube being inserted through the neck of the glass funnel, which is placed in the throat of the jar.

In a jar of one gallon capacity three or four pounds of bromine can be easily made into hydrobromic acid by observing the following conditions: One pound of phosphorus or more, enough to keep the bottom of the jar covered with a layer of phosphorus, even after all the bromine has been added, about a pint of water having been first put into the jar, then add ice enough to about half fill the vessel, insert a gallon funnel in the throat of the jar, adjust the funnel-tube so that it shall be a short distance above the surface of the phosphorus, and keep it in place by means of a small wedge of cork, fill the funnel, say to one-third of its capacity, with small pieces of ice, place the jar in any convenient vessel large enough to admit of its being surrounded with ice, and finally slowly add the bromine through the funnel-tube. If the addition of the bromine is carefully made, the fumes of the hydrobromic acid and of bromine that may arise within the jar will be fully condensed by the ice in the funnel. It is well to place the bromine in ice, so as to thoroughly chill it before pouring it through the funnel-tube. The idea of having so large an excess of phosphorus is, first, to make sure that each drop of bromine shall immediately come in contact with the phosphorus as soon as it reaches the bottom of the jar, and thus avoid the accumulation of bromine, which would give rise to an explosion if any considerable quantity should at any one time react on the phosphorus; and, secondly, to shorten the time that it will take to convert that portion of the bromine which dissolves in hydrobromic acid, and the quantity of bromine that will be so dissolved will increase with the quantity of hydro-

bromic acid contained in the mixture. If only a slight excess of phosphorus is used, the action of the free bromine in solution is very slow, but by largely increasing the quantity of phosphorus the surface presented to the action of the bromine is very greatly extended, and when the reactions have ceased, which will be indicated by the liquid becoming colorless, the mixture of hydrobromic acid and phosphoric acid may be separated from the undissolved phosphorus, and then the hydrobromic acid distilled off from the phosphoric acid, the latter remaining in the retort as a syrupy liquid, which will be pure phosphoric acid, and which can, of course, be used in making the officinal dilute acid by properly diluting with distilled water. If too much water was used in the first part of the process, the first portions of the distillate will not contain hydrobromic acid, but as the distillation proceeds the acid strength gradually increases, till a liquid is finally obtained having the specific gravity of about 1.486, which contains about 47 per cent. of the anhydrous acid, boils at 259° F. (126° C.), and the composition of which is represented by  $\text{HBr}, 5\text{H}_2\text{O}$ . I have brought for the examination of the members a sample of this concentrated hydrobromic acid. Of the uses to which a pure solution of hydrobromic acid may be put I need not enlarge. I will only say that it gives the pharmacist a most ready means of preparing pure bromides, such as potassium, sodium, ammonium, calcium, and the many other bromides that are in such constant demand for use at the dispensing counter.

For the production of bromides from the above-named acid, it is only necessary to neutralize the hydrobromic acid with the oxides, carbonates, or hydrates of the metallic base or of the alkaloid, a bromide of which may be desired.

Boston, September, 1875.

## COMMERCIAL BICARBONATE OF SODA.\*

BY P. W. BEDFORD.

QUERY 41.—A quantitative estimation of the carbonic acid in the numerous brands of bicarbonate of soda existing in the American market, and of the impurities.

In pursuing his researches in order to answer the above query, the writer has examined eleven brands of bicarbonate of soda, these fairly representing the kinds usually found in this market.

Of this number, four represent the English manufacturers, namely, Chance Brothers, of Birmingham, C. Allhusen & Sons, Lee, and Jarrow, all of Newcastle-on-Tyne.

Representing the French manufacturers, are two samples, one in crystals, the name of the maker being unknown, the other in powder, sold as Schering's, but which it is known is not made by him, but is only purchased and exported by him.

It is usual for exporting chemists in France and Germany to purchase any good brand of bicarbonate of soda produced in France, Belgium, and Holland, and export it as French.

The remaining varieties examined are of American manufacture.

Notwithstanding the improvement in the manufacture of this article by what is known as the "ammonium" process, it is not known that much, if any, made by this process reaches this country.

Some few of the foreign manufacturers use cryolite instead of chloride of sodium, but they do not compete in this market with the American makers of cryolite soda, better known as "Natrona" soda.

Of the American manufacturers of bicarbonate of soda, the most extensively known are the Pennsylvania Salt Company, who produce at their works at Pittsburg, the cryolite or Natrona soda, and at Philadelphia a brand known as "Greenwich" bicarbonate of soda, the latter being made from chloride of sodium.

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\* Read at the sixth session.

"Dwight's" manufacture, as also that of Church & Co., have an extensive sale chiefly among grocers, while Kidder's soda has always held a high rank as a medicinal soda, on account of its more pleasant taste.

In making an examination of these various brands of bicarbonate of soda, the writer has mainly followed the plan of Dr. E. R. Squibb, as given in a paper read before this Association at its meeting in St. Louis in 1871.

Theoretically this salt should contain 52.25 per cent. by weight of carbonic acid, and when heated to low redness should leave a residue of carbonate of soda amounting to 63.2 per cent. of the amount tested.

Bicarbonate of soda is soluble in ten parts of water at 70° F. The samples examined were all soluble in this proportion, except the small quantities of dirt, ash, and similar impurities which were present in some of the samples, and which are probably due to want of care in process of manufacture.

The chief chemical impurities are chlorides and sulphates, which if present are readily detected by the appropriate reagents.

In an article made on the immense scale that this is, it is impossible and unreasonable to expect to find it chemically pure. The price at which it is produced forbids that nicety of manipulation which we expect to find in the finer chemicals. It is, therefore, gratifying to know of this article, so largely employed in domestic economy, that it is so free from impurities, and that the small quantities which are found in some of the samples are due not to intentional adulteration, but to the fact that the cost of removing them is too great to enable the manufacturers to sell their product at market rates.

The estimation of the carbonic acid was made by means of Schrotter's apparatus, while the determination of chlorides and sulphates was made by volumetric analysis, and each verified by several repetitions.

The annexed table gives the results of these experiments, from which it will be seen that in quality the brands examined may be fairly arranged in the following order: Natrona,

Greenwich, Lee's, Allhusen's, French, Schering's, Chance's, Jarrow's, Dwight's, Kidder's, Church's.

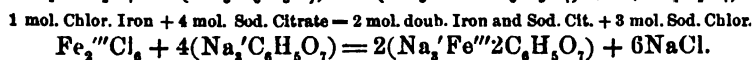
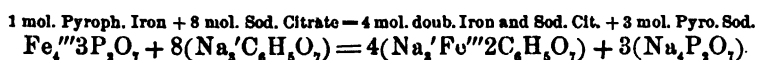
Manufacture or brand.	Loss on heating one gram should be 0.368, or 36.8 per cent. The actual loss was, per cent.	Loss of carbonic acid should be 52.25 per cent. The actual loss was per cent.	Chloride of sodium, per cent. in sample.	Sulphate of sodium, per cent. in sample.
Chance Bros.	35.5	50.11	.08	.14
Allhusen.	35.7	50.76	.04	None.
Jarrow.	35.2	49.00	.10	.11
Lee.	36.5	51.35	None.	.06
Schering.	35.2	50.20	.04	.08
French crystals.	36.2	50.18	.10	.014
Natrona.	35.7	50.80	None.	None.
Greenwich.	36.5	51.89	None.	.11
Kidder.	35.0	48.81	.15	.105
Dwight.	35.5	50.80	.71	.636
Church.	35.0	47.11	.71	.90

## NOTE ON THE TASTELESS IRON COMBINATIONS.\*

BY E. RUTTER.

THE following experiments were undertaken with a view of throwing further light on the constitution of this class of salts, and more especially to support the theory advanced by the writer (Am. Jour. Pharm., Dec. 1873).

This, shortly stated, is as follows: That a mixture of a ferric salt and an alkaline citrate is not simply a solution of the former in the latter, but a definite chemical reaction, which takes place according to the following equations, taking the pyrophosphate and chloride for examples:



\* Read at the fifth session.

The iron in all cases changing place with half the alkali of the citrate, and forming a double citrate of iron and alkali. It was supposed that this double citrate being of an amorphous character might possibly be separated from the crystalline bodies formed with it by means of dialysis.

The chloride was first experimented upon, chloride of sodium having a high dialytic power. A 50 per cent. solution, after being dialyzed several times, and the resulting fluids evaporated, and again dialyzed until an almost colorless solution was obtained, gave on evaporation a crop of well-defined crystals of chloride of sodium, traces of iron remaining in the mother liquor.

A solution of the pyrophosphate of the United States Pharmacopœia was then treated in a similar manner, but failed to yield any crystals.

It was supposed that the substitution of citrate of sodium for citrate of ammonium might give better results, and a solution was prepared and treated as before. On evaporation a white mass was obtained, which, although containing but slight traces of iron, refused to crystallize.

A solution of the iodide was then prepared, and on being dialyzed yielded a considerable quantity of crystals of iodide of potassium. On again dialyzing the original solution a further crop of crystals was obtained, but much colored from iodine set free by continued exposure.

The failure to obtain crystals from the pyrophosphate might be regarded as evidence of a difference in constitution between that substance and the other tasteless salts, but the fact of their evident identity, and that it takes in each case a definite equivalent of alkaline citrate, neither more nor less, to produce the invariable green color, will hardly admit of this view. The much higher dialytic power of chloride of sodium and iodide of potassium, as compared with pyrophosphate of sodium, is more likely to be the cause of the difference in results.

While making these experiments it was noticed that a solution of pyrophosphate made with citrate of ammonium, spoiled rapidly through loss of ammonia and development of

butyric acid from the free citric acid, while a solution made with sodium citrate remains unchanged. This might possibly be of use to those who are making elixirs with ferric pyrophosphate.

NEW YORK, August 26th, 1875.

## THE PREPARATION OF IODIDE OF ARSENIC.\*

BY JAMES F. BABCOCK.

THERE are, no doubt, quite a number of chemical products described in the list of preparations of the United States Pharmacopœia, which being better adapted to production by the large manufacturing chemists, than by those who work on the scale of the Pharmacopœia, might well be transferred to the list of the *Materia Medica*; or having fallen into disrepute should be omitted altogether, and it is possible that iodide of arsenic, the subject of this paper, belongs to one, if not both of these classes. But all will admit that where an article is retained in the list of preparations, the process described should be the *best* process known for the purpose, and the product, which may be obtained by careful manipulation as the result of the formula given, should correspond to the description of the substance in the smaller type which, in the Pharmacopœia, follows the formula itself. The process for the preparation of iodide of arsenic, as given in the United States Pharmacopœia, consists in heating together the so-called metallic arsenic with iodine, in the proportions of one part of the former to five of the latter, and after the combination has taken place pouring the fused mass upon a porcelain slab to cool.

The product is described as an orange-red crystalline solid, wholly soluble in water.

The product obtained by this process, however, does not correspond to the description given, because not only are the proportions such as will leave some metallic arsenic unacted on, that is to say there is a trifle too little iodine or too

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\* Read at the sixth session.

much arsenic, according to the formula ; but iodide of arsenic, even when *pure*, undergoes a slight decomposition when dissolved in water, a small quantity of a yellowish-white *insoluble* powder being produced, which is described in the books as an oxyiodide of arsenic.

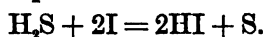
Moreover, metallic arsenic is somewhat difficult to obtain in the market, not being generally kept by wholesale druggists, except as "cobalt" or fly-poison, which is too impure to be of service, and ordinary commercial metallic arsenic produces an iodide which is not only of uncertain composition, but is either very dark-colored or brownish, and fails to dissolve perfectly, independent of the decomposition above noted, and if used for the preparation of the solution of iodide of arsenic and mercury produces an unreliable article. Indeed, Donovan's solution has fallen into disrepute with many physicians, because the amounts of arsenic, mercury, and iodine present are so variable.

The writer proposes a process which avoids the use of metallic arsenic, and produces an iodide of a much purer character, and of more definite composition.

The process consists in the solution of arsenious acid in hydriodic acid, and the subsequent evaporation of the solution to dryness.

Hydriodic acid for this purpose is prepared by the process of the United States Pharmacopœia of 1860, viz., by passing sulphydric acid gas into water containing iodine in suspension.

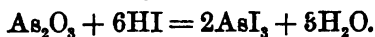
A troy ounce of iodine is placed in a suitable vessel, with ten or twelve fluid ounces of water, and the washed gas passed into it until the liquid loses all color, except that due to the precipitated sulphur.



The liquid is filtered to remove the sulphur, and boiled until all odor of sulphydric acid has ceased. The hydriodic acid is placed in an evaporating-dish, and to it is added one-fourth ounce of arsenious acid. The liquid is heated till the arsenious acid is dissolved, the solution filtered if necessary, and evaporated to dryness.



The reaction takes place between one molecule of arsenious acid and six molecules of hydriodic acid.



The product is in orange-red crystalline scales of definite composition, and capable of combining with its full equivalent of iodide of mercury.

Donovan's solution, prepared with this product, is of definite composition, of pale-yellow color, and free from excess of iodine.

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## EXPERIMENTS UPON DILUTE HYDROCYANIC ACID.\*

BY JOHN U. LLOYD.

DURING the summer of 1869, my attention was directed in a particular manner to the unstableness of the official preparation by the decomposition of the contents of eight one-ounce vials of the above-named acid. They were the remainder of a case that originally contained twelve, each bottle was waxed and securely tied over with bladder, they were protected from the influence of light by wrappers of thick dark-blue paper, in addition to which was the pasteboard case enveloping them all.

Until the fifth vial was taken from the box (they were sold one at a time, with considerable intervals between), no signs of decomposition had been observed. Upon removing the wrapper of the fifth bottle its contents were found to have undergone a complete disintegration, the liquid within was of a reddish color, while around the sides and upon the bottom of the bottle adhered a tarry black sediment. Upon examination it was found that five of the remaining seven bottles of acid had spoiled, while two were to appearances unaltered.

Afterwards I continued to follow the directions prescribed by the U. S. P. for preparing this acid, but instituted during the month of August, 1870, a series of experiments, the object

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\* Read at the sixth session.

being to discover, if possible, a process that would be an improvement upon the official formula.

I will forego mentioning in this article the experiments that did not result in any particular advantage, or that failed entirely, as they can be of little interest and no benefit to any one; even brief descriptions will consume much space, and I will confine myself accordingly to the one that, in my opinion, produced a preparation superior to the present official acid.

Assuming the water which comprises the bulk of the official acid only to be a dilutant, I dispensed in my experiment with as much as possible, substituting in its stead *strong alcohol*; for the accomplishment of this, I employed for dissolving the ferrocyanide of potassium as small an amount of cold water as was practicable. In a separate vessel I gradually added an amount of sulphuric acid (that was equivalent for the complete decomposition of the ferrocyanide of potassium), to five times its weight of alcohol, carefully avoiding any considerable increase of temperature; the mixture was then cooled by surrounding the bottle with ice-cold water, and then poured with constant agitation into the solution of ferrocyanide of potassium; the bottle was securely stopped, and occasionally shaken for twelve hours, after which it was allowed to remain quiet the same number of hours, then the liquid overlying the heavy precipitate of sulphate of potassium was filtered into a tubulated retort and distilled, the heat being obtained from a steam-bath. The exit of the condensing-tube projected into the neck of the receiver, around both of which a piece of bladder was securely fastened; through this bladder a few small holes were punctured with a pin. Both the condenser (Liebig's) and the receiver were constantly cooled with ice-water.

After the operation was completed, a portion of the distillate was removed and the proportion of hydrocyanic acid ascertained; the remainder was then reduced to the U. S. P. strength with alcohol.

One pint of this acid was put into a sixteen-ounce glass-stoppered bottle, which was then securely waxed and tied over with bladder. After being exposed to the action of

diffused light for fifty days, the acid upon examination was found to be perfectly transparent and of full strength.

Two fluid ounces were then removed, and the mouth of the bottle containing the fourteen ounces was covered with a piece of porous paper, in which manner it was allowed to remain one hour; the stopper was then replaced *without being waxed or tied over*, and the bottle again placed in a situation that exposed it to diffused light. Fifty days from this time the acid was transparent and colorless.

Again the stopper was removed, and the mouth of the vial loosely covered with a bit of porous paper; after an hour had passed the stopper was inserted (not waxed) and the bottle wrapped with blue paper, then placed in a dark closet and allowed to remain fifty days, at the end of which time no decomposition had occurred.

After this, until the present time, the bottle has been exposed by turns to the influence of light and darkness; occasionally the stopper was removed often for a considerable length of time, and yet, notwithstanding the vicissitudes through which it has passed, the acid has undergone no apparent decomposition; it is perfectly transparent, and retains in a forcible manner the characteristic odor of prussic acid.

Twelve one-ounce glass-stoppered vials were filled along with the aforementioned sixteen-ounce bottle when the acid was prepared. Six of them were wrapped with blue paper, the remainder allowed to go uncovered; the contents of these vials did not decompose; at the present time I retain but one, and this is unchanged.

Some time during the first week of August, 1872, I repeated the aforementioned experiment, excepting that I slightly modified the process for preparing the alcoholic solution of hydrocyanic acid; practically, however, this alteration could exert no influence upon the result of the experiment, for the principle of substituting alcohol for water, as embodied in the foregoing illustration, was strictly adhered to. I prepared at this time one hundred and fifty fluid ounces, of which one hundred and twenty-eight were put into a gallon glass-stoppered bottle, the remainder was filled into ounce vials.

The large bottle was cautiously stopped and placed aside for thirty-five days. No change occurred.

One hundred and twelve one-ounce vials were now filled from this bottle, which was again securely stopped, tied over with bladder, and allowed to stand seven days, after which time the inclosed sixteen fluid ounces proved to be as transparent and colorless as when freshly prepared.

The acid was then poured into a sixteen-ounce glass-stoppered bottle, securely sealed, and allowed to remain uncovered for the period of a year. No change.

Two fluid ounces of acid were now removed, the bottle containing the fourteen ounces stopped and tied over with bladder. At the present time no signs of decomposition are apparent. Of the acid which was filled into one-ounce vials I have heard no complaint; the specimens placed aside by myself are unaltered.

In the latter part of July, 1874, the experiment was repeated, one hundred and twenty fluid ounces of acid being prepared; this was securely inclosed within a gallon glass-stoppered bottle; at the present time its contents are limpid and colorless.

Two (2) fluid ounces of the acid prepared in the month of August, 1872, were securely inclosed within one-ounce glass-stoppered vials and exposed to the temperature of one hundred and sixty (160) degrees F. for one hundred and sixty-eight (168) consecutive hours. The acid remained transparent; with nitrate of silver it gave a white precipitate.

Into a one-ounce graduate eight (8) fluid drachms of the acid were poured, and after being covered with a piece of porous paper were placed aside until reduced by spontaneous evaporation to six (6) fluid drachms. No discoloration; a few drops gave a decided precipitate with solution of nitrate of silver.

Again the graduate was covered with a piece of porous paper, and the contents allowed to evaporate spontaneously until reduced to four (4) fluid drachms; the residue was perfectly transparent, but possessed no odor of hydrocyanic acid, neither did it yield a precipitate with solution of nitrate of silver.

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Another graduate, covered in like manner and containing a fluid ounce of the acid, was exposed to the temperature of one hundred and sixty degrees (160) F. until its contents had become reduced to six fluid drachms, which remained uncolored and gave a bulky white precipitate when dropped into solution of nitrate of silver. Upon continuing the heat until but four (4) fluid drachms remained, I found the acid had entirely escaped, as my tests failed to discover its presence in the residue which remained transparent.

I submit the foregoing condensed notes upon one of the lines of experiments pursued by myself. It will be perceived that a period of five years is embraced, and that during this time I have been unable to induce a single ounce of the alcoholic solution of hydrocyanic acid to undergo decomposition, although individual specimens were exposed to most unfavorable influences and conditions they could never have experienced behind the prescription counter.

This article is only an abstract from a series of notes bearing upon *decomposition*, and I feel that I will be departing from the subject if I inculcate the results of investigations that were instituted for the purpose of discovering the relative proportion, under similar circumstances, of acid that was lost by evaporation from the U. S. P. dilute hydrocyanic acid, and from an acid made by this process; however, I can say, without burdening the paper with details, that, according to my experience, alcohol is far superior to water as a solvent. The bulk of the alcoholic solution decreases more rapidly upon exposure than the aqueous, but the acid in the aqueous solution is dissipated faster than the acid of the alcoholic, and consequently after similar exposures the proportion of acid is greater in the alcoholic solution than it is within the watery.

These notes, I trust, will prove of interest to the members of our society, and may, perhaps, aid and assist the revisors of the next Pharmacopœia.

CINCINNATI, O., August 10th, 1875.



## ON THE ACTION OF NITRIC UPON CARBOLIC ACID.\*

BY C. GILBERT WHEELER, OF CHICAGO.

QUERY 89.—It is asserted that it is highly dangerous to mix nitric and carbolic acids on account of the violent and instantaneous explosions that almost invariably occur; what are the proportions most likely to occasion the explosions, and what are the chemical reactions resulting when these two substances are brought into contact?

THE circumstances which have given rise to the foregoing inquiry, as I understand, are substantially as follows:

A physician in a prominent Western city, while lecturing at a medical college in which he was a professor, had occasion to employ some nitric acid. Taking what he supposed was an empty bottle, he went to the acid supply, and proceeded to pour out a small quantity. As soon as a very trifling amount was introduced, it is said that a violent explosion occurred, causing the breaking of the small bottle, and projecting some of its contents into the face and eyes of the professor. Considerable quantities of reddish fumes were evolved, and, it is claimed, a detonation was heard.

The results of the accident were quite serious, as the professor was thereby confined to his room for many weeks, losing, for most of that time, his entire sight, and has permanently lost the use of one of his eyes. The supposed empty bottle was afterwards recognized as one which had contained a minute quantity of *carbolic acid*.

I have made various experiments regarding the action, at ordinary temperatures, of nitric upon carbolic acid, acting both upon the crystalline form of the latter, and upon its aqueous solutions, also employing nitric acid of various strengths.

I do not deem the results sufficiently important to warrant my occupying the Association with their detailed statement, but will only sum up my conclusions. Concentrated nitric acid reacts violently and promptly upon crystallized carbolic acid, generating much nitric oxide, and producing a sound

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\* Read at the fifth session.

like that obtained on plunging a hot iron in water, the moment the two acids are brought together. Were I to compare the reaction with another familiar one, I should say that it was nearly as intense as that of concentrated sulphuric acid upon chlorate of potassium, but without any of the crackling or decrepitating sound which these reagents occasion, nor is there usually any projection of the solid, not yet decomposed acid. It is somewhat more energetic than the reaction of nitric acid upon uric acid.

Passing from the solid carbolie acid to its strongest aqueous solution, and from this successively to those solutions much weaker; also, on the other hand, on increasing, step by step, the dilution of the nitric acid, the change in the violence of the reaction is a regularly diminishing one, until it ceases to have any marked energy whatever. I do not think that a particular statement of the phase of energy displayed at each of these steps of dilution would be of interest, any more than it would be to note and report upon the sound emitted on plunging into water bars of iron heated to various degrees of temperature, or upon the amount of agitation caused by the commingling of solutions containing variable proportions of an alkaline carbonate and a mineral acid. It is sufficient to state that with each addition of water to the carbolie or nitric acid, a reduction in the intensity of the reaction follows, until finally there is apparently no reaction whatever at ordinary temperature. The strongest reaction is not comparable in intensity to the explosion of ordinary explosives, such as gunpowder, guncotton, or nitroglycerin.

I now pass from the consideration of such phenomena, in connection with the reaction, as are rather of a *physical* character, to the specific chemical changes, and the products that result. These are not many or very complex ones. The nitric acid here, as is usual when acting upon organic bodies, both *oxidizes* and *substitutes* at the same time the monad compound radical nitryl for one or more atoms of hydrogen. As a result of the latter phase of the reaction, we obtain the nitro compounds mono-, bi-, and trinitro-phenol, the latter compound being the well-known picric acid. Of these three compounds but little

of the first is obtained, and often no other nitro body is formed than the trinitro-phenol or picric acid. In fact this is one of the chief methods of obtaining picric acid, although, on a manufacturing scale, the mixed products of the distillation of the tar of gas-works is more commonly employed.

The other products of the reaction are oxalic acid, a brownish-yellow resin, carbonic dioxide, and nitric oxide.

To revert now to the question as to the "explosion" which is said to have resulted, I am of the opinion that, while beyond all doubt a violent reaction occurred, yet an explosion, in the proper sense of that term, did not.

Worcester defines an explosion to be "a sudden bursting with noise; a sudden and loud discharge."

Webster, in defining the same word, does so in the following language: "Bursting with a loud noise; a sudden inflaming, with force, and a loud report."

It is certain that, in the light of these definitions, "explosion" is, under the circumstances, attendant upon bringing in contact the two chemicals in question, to say the least, a rather too *superlative* expression. Of course any chemical reaction involving, as here, the liberation of gas might, if occurring in a closed vessel, cause the fracture of the latter, and this perhaps in an *explosive* manner. But chemical reactions of such a character are not likely to be performed in close vessels.

The theory that the so-called explosion could have been caused by the picric acid formed being immediately exploded by the heat which accompanied the reaction, cannot, I think, be maintained; as, first, the temperature of the mixture could hardly, under the circumstances, exceed that of the nitric acid present, a temperature not sufficiently elevated to cause the explosion of picric acid. Again, picric acid is *not* readily explosive, although many of the picrates are. Picric acid, with care, *may even be distilled*.

In my judgment the so-called "explosion" was simply the rapid development of gases, which, in their violent liberation, projected the nitric acid (under the circumstances present in large excess) in all directions, and into the face and eyes of



the professor. The heat of the reaction might have readily caused the fracture of the bottle, as is stated to have occurred.

If this query has not developed much that may be scientifically important, it at least gives an opportunity of repeating an axiom that is too often lost sight of by chemical manipulators: "*A place for everything, and everything in its place.*"

If only *clean* bottles had been on the shelf where the professor looked for one, he might have escaped the loss of his eyesight. However, not this lesson alone may be learned, but also we are reminded that great caution should be used in adding strong oxidizing agents to organic bodies, and particularly nitric acid, which besides often itself acting violently, also forms nitro bodies which, as is well-known, are, as a class, *explosive*. Finally, it is always a good rule to bring chemicals together only in minute quantities, and with caution *where we have not in advance informed ourselves as to their properties, and their action upon each other*. In short, other things being equal, he is the best pharmacist who thoroughly and *practically* understands the chemical nature of the substances he deals in.

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## ON BROMIDES AND HYDROBROMATES.\*

BY CHARLES BULLOCK, PHILADELPHIA.

QUERY 44—An essay on the preparation of the various bromides of the organic and inorganic bases used in American pharmacy.

WHEN bromine is united direct with the caustic alkalies it plays the same part as iodine and chlorine, forming five parts of bromide and one of bromate.

The most important of the bromine compounds is the potassium salt. By the United States Pharmacopœia bromide of iron is first formed, and the ferrous bromide decomposed by carbonate of potassium. The British Pharmacopœia directs its preparation by the union of bromine with

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\* Read at the fifth session.

caustic potash. The bromate formed during the process is reduced to bromide by subsequent calcination of the product with charcoal.


Of the two processes, the British offers the advantage of avoidance of a tedious washing of the precipitated carbonate of iron, and a long evaporation.

The bromide of potassium, now so extensively in use, is made by the manufacturers on a large scale by the process of the British Pharmacopœia.

The alkaline bromides, other than of potassium and sodium, can readily be prepared by the process of Ferdinand F. Mayer, described in his paper "On Alkaline Iodides and Bromides," published in the American Journal of Pharmacy, 1862, vol. xxxiv, p. 289. The action of ferric iodide and bromide with alkaline carbonates, whether the carbonates are soluble or insoluble, gives rise to alkaline iodides and bromides; while the presence of an excess of iron causes the reduction of the oxygen acids (if formed). The products are free from iodates and bromates. I have repeatedly used the process of Mr. Mayer with success and satisfaction.

In the preparation of bromides of iron, zinc, and cadmium, there is no difficulty experienced, bromine uniting, as it does directly, with these metals. In the case of cadmium the union of the elements is slow, and time has to be allowed to perfect the process.

Bromide of ammonium is directed by the United States Pharmacopœia to be prepared by decomposition of ferrous bromide by ammonia water. Mr. Charles Rice, in the American Journal of Pharmacy for 1873, vol. xlv, p. 249, describes a process for the preparation of this salt by the decomposition of bromide of potassium by sulphate of ammonia. The sulphate of potassium formed is rendered more insoluble by the addition of alcohol. The process described by Dr. Wilson H. Pile for making this salt, published in the Proceedings of the American Pharmaceutical Association for 1874, p. 434, affords a ready method for its production. The author states that no bromide of nitrogen is formed, and that the product is free from bromate.



For the *extemporaneous* preparation of bromides, there is no process more satisfactory than the decomposition of bromide of barium by a sulphate of the base desired, when that sulphate is soluble. Bromide of barium is readily prepared by the process of Mr. Mayer, before alluded to.

It is desirable, however, to utilize some bromine salt in common use for this purpose. Bromide of potassium offers this advantage; and, if the bromide to be obtained is soluble in dilute alcohol, the product will be almost entirely free from impurity. The process is based on the sparing solubility of sulphate of potassium in dilute alcohol, one fluid ounce of dilute alcohol taking up only 1.02 grains, equal to about 0.25 per cent. of sulphate.

The literature of the bromides of the organic bases is very scant, and experiments had to be made to determine their character, with the following results:

*Hydrobromate of cinchonia* crystallizes in prismatic needles. 100 parts of water, at 70° F., take up 5.6 parts of the salt. It is sparingly soluble in alcohol, and dissolves readily in dilute alcohol.

*Hydrobromate of morphia* crystallizes in prismatic needles. 100 parts of water, at 70° F., take up 9 parts of the salt. It is sparingly soluble in alcohol, and dissolves readily in dilute alcohol.

*Hydrobromate of quinia* crystallizes in prismatic needles, having a disposition to arrange themselves in rosettes. 100 parts of water, at 70° F., take up 2.1 parts of the salt. It is sparingly soluble in alcohol, and dissolves readily in dilute alcohol.

*Bihydrobromate of quinia* crystallizes in cubical plates. 100 parts of water, at 70° F., take up 38.7 parts of the salt. It is sparingly soluble in alcohol, and dissolves readily in dilute alcohol.

*Hydrobromate of strychnia* crystallizes in prismatic needles. 100 parts of water, at 70° F., take up 3.2 parts of the salt. It is sparingly soluble in alcohol, and dissolves readily in dilute alcohol.

All of the aforementioned bromides of the organic bases

being soluble in dilute alcohol, the following formulas for their manufacture yielded satisfactory results:

*Hydrobromate of Cinchonia.*

R.—Cinchoniæ Sulph., . . . . .	86.6 grains.
Potassii Bromid., . . . . .	11.7 “

Dissolve the cinchonia sulph. in one fluid ounce of warm alcohol, and the bromide of potassium in one fluid drachm of water. Mix the solutions; filter from the precipitated sulphate of potassium; add one and a half fluid ounces of water to the alcoholic filtrate, evaporate, and crystallize.

*Hydrobromate of Quinia.*

R.—Quiniæ Sulph., . . . . .	48.6 grains.
Potassii Bromid., . . . . .	11.7 “

Dissolve the quiniæ sulph. in one fluid ounce of warm alcohol, and the bromide of potassium in one fluid drachm of water. Mix the solutions; filter from the precipitated sulphate of potassium; add two fluid ounces of water, evaporate, and crystallize.

*Bi-hydrobromate of Quinia.*

R.—Quiniæ Sulph., . . . . .	48.6 grains.
Potassii Bromid., . . . . .	28.4 “
Acid Sulph. Dil. (U. S. P.), . . . . .	gtt. xxxv.

Dissolve the quiniæ sulph. in half a fluid ounce of water, to which the dilute sulphuric acid had previously been added, and the bromide of potassium in one fluid drachm of water. Mix the solutions; add one fluid ounce of alcohol; filter from the precipitated sulphate of potassium, evaporate to six drachms, and crystallize.

*Hydrobromate of Morphia.*

R.—Morphiæ Sulph., . . . . .	32.5 grains.
Potassii Bromid., . . . . .	11.7 “

Dissolve the morphiæ sulph. in one fluid drachm of warm

water, and the bromide of potassium in one fluid drachm of water. Mix the solutions; add half a fluid ounce of alcohol; filter from the precipitated sulphate of potassium, evaporate, and crystallize.

*Hydrobromate of Strychnia.*

R.—Strychniæ Sulph., . . . . . 45. grains.  
Potassii Bromid., . . . . . 11.7 "

Dissolve the strychniæ sulph. in a mixture of one fluid ounce of water and two fluid drachms of alcohol, and the bromide of potassium in one fluid drachm of water. Mix the solutions; add one fluid ounce of alcohol; filter from the precipitated sulphate of potassium; add one fluid ounce of water to the alcoholic filtrate, evaporate, and crystallize.

The term "bromide," applied to bromine combinations with organic bases, is of doubtful propriety, as the alkaloids neutralize hydrobromic acid without displacement of the hydrogen of the acid. The resulting salts are more correctly termed *hydrobromates*.

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## ON TESTS FOR THE PURITY OF CHLORAL HYDRATE.\*

BY JOSEPH ROBERTS, BALTIMORE, MD.

QUERY 40.—What are the best tests of purity of hydrate of chloral?

LIEBREICH, as quoted by Attfield, gives the characteristics of pure hydrate of chloral thus: Colorless, transparent; does not decompose by the action of the atmosphere; does not leave oily spots when pressed between blotting-paper; affects neither cork nor paper; smell agreeable, aromatic, but a little pungent when heated; taste bitter, astringent, slightly caustic; seems to melt on rubbing between the fingers; dis-

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\* Read at the fifth session.

solves in water like candy without first forming oily drops; dissolves in bisulphide of carbon, petroleum ether, water, and oil of turpentine. Boiling-point  $203^{\circ}$  to  $205^{\circ}$  F. Gives no chlorine reaction on treating its solution with nitrate of silver.

So far as commercial samples of hydrate of chloral have come under my observation, with but one exception, they have all been of good quality, and of such purity as to justify their use as therapeutic agents, with confidence in their effects. I have found none, however, that will fully respond to the requirements of Liebreich, nor to those of our own Pharmacopœia.

My experiments with hydrate of chloral have neither been as full nor as accurate as they should be. Such as they are, however, and my deductions therefrom, I will state.

I procured samples of hydrate of chloral of the manufacture of Schering, of Merck, of Squibb, and of Saame & Co. Each sample was found to respond in odor, taste, solubility, and volatility to the standard of our Pharmacopœia.

Solutions of the several samples were then made and tested, in the usual manner, for chlorine with nitrate of silver. All gave evidence of the presence of uncombined chlorine. That made by Schering, and that made by Merck, gave, upon the addition of the test, a slight opalescence, a slight cloud; that made by Squibb gave a rather more decided reaction; that made by Saame & Co. gave a white curdy precipitate. All the solutions became clear upon the addition of aqua ammoniæ.

The presence of uncombined chlorine in each sample was thus demonstrated; in proportion so small, however, with the exception of that in sample made by Saame & Co., that it is safe to disregard it, as it could not possibly interfere with its medicinal effect.

In this connection the thought suggests itself: Is our Pharmacopœia correct in exacting a test of purity that the inherent qualities of the substance itself make it impossible to maintain? I assume, as a fact, that howsoever pure and free from uncombined chlorine any given sample may be when it

leaves the laboratory of the manufacturer, that under the necessary and usual exposure incident to dispensing it, that chlorine will be developed.

Further, that the small quantity of chlorine present in good commercial samples of hydrate of chloral does not in any manner interfere with its action as a medicine.

Would it not be better for a work like our Pharmacopœia, that is intended to be practical in all its teachings, to recognize the fact that it is impossible to put hydrate of chloral upon the market that is, and will remain, absolutely free from uncombined chlorine?

Would it not be more in keeping with the character of the work to fix a standard of limit, and let samples that contain an undue quantity be rejected as unfit for use?

The several samples were then subjected to the action of hydrate of calcium, in suitable apparatus for collecting the chloroform produced by the reaction.

Two equivalents of hydrate of chloral reacting with one equivalent of hydrate of calcium, resulting in the production of two equivalents of chloroform and one equivalent of formiate of calcium and two of water.

The reaction is marked, and chloroform rapidly evolved. Yet the process in my hands did not, as a means of estimating the purity of hydrate of chloral, prove satisfactory.

I experienced much difficulty in entirely liberating the chloroform generated from the thick magma of the hydrate of calcium, and thus found my results vitriated.

Hydrate of sodium gave a much more satisfactory result, yielding, with a sample made by Schering (the only one thus tested), 70 per cent., by weight, of chloroform. The normal quantity contained in pure hydrate of chloral being 72.2 per cent.; a result, after making due allowance for imperfections in manipulation, that proved it to be of great purity.

It is, however, I think, to the formic acid, the other resultant product of the action of the alkalies on hydrate of chloral, that we must look for our most ready and accurate test of the purity of hydrate of chloral.

The process consists in taking a known quantity of hydrate

of chloral, and decomposing it by a known quantity of any given alkali in excess, and then in the usual manner by volumetric analysis determining the quantity of uncombined alkali left, and thence calculating the quantity of hydrate of chloral in the sample under examination.

In offering this as my reply to Query No. 40, I make no claim to having proffered anything new; I merely point out that road that seems to me to lead most directly to the desired result.

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## ON THE ANTISEPTIC PROPERTIES OF CHLORAL HYDRATE.\*

BY T. ROBERTS BAKER, RICHMOND, VA.

QUERY 10 —It has been asserted that chloral hydrate possesses powerful antiseptic properties, and that it has been used to preserve anatomical preparations; an essay on this subject.

IN accepting Query No. 10 I felt some misgivings as to my ability to fulfil expectations with reference to a profitable investigation of the subject. One who is actively engaged in a prescription and general retail business in the centre of a city has little time to devote to experiments of the character demanded by such an investigation, and hence I have been compelled to rely for the most part upon the testimony of others who had not only more time, but greater facilities than myself. I am indebted to my friend, Dr. Isaiah H. White, demonstrator of anatomy at the Medical College of Virginia, for a part of the information obtained, as will be seen by his report of experiments performed in the dissecting-room during the winter of 1874 and 1875.

My own experiments were of rather a limited character, and were as follows: On the 12th of December, 1874, I procured some fresh mutton, and having divided it into pieces about two inches square, I placed them in quinine bottles, and added to one a solution of chloral hydrate in distilled

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\* Read at the fourth session.



water, strength five grains to the fluid ounce, to another a ten-grain solution, to another a fifteen-grain solution, to another a twenty-grain solution, and to the last one a sixty-grain solution. In each bottle the quantity of the solution was about twice as much as was necessary to cover the surface of the mutton. These bottles were loosely stoppered, and placed on a shelf in a room where the temperature was never below 70° F. all winter. At the expiration of a month there was no perceptible change either in the odor of the meat or its appearance, except in the color, and this was due to the fact that the water had dissolved out the blood, and thus colored the liquid to such an extent as to obscure my observation. I then poured off the solutions from each specimen, washed the meat, and substituted other solutions exactly corresponding with the original. The meat, after the solutions were removed, was apparently as fresh and sweet as when first placed in the solutions. On the 5th of May, 1875, very nearly five months from the time when the mutton was first placed in the solutions of chloral hydrate, these specimens presented the following characteristics, viz., the bottom of each bottle was slightly covered with a deposit of organic matter, and the same finely flocculent matter covered the surface of the mutton.

The only odor was a faint smell of tallow, and a slight smell of chloral. The ten-grain solution was then poured off, and the mutton washed with pure water. After washing the mutton, it was found to be as fresh and odorless as it was originally. The color was somewhat brown, owing to the absence of blood, and the consistence of the meat was perfectly natural. This specimen was again placed in a fresh ten-grain solution, and the others were allowed to remain undisturbed. These, however, presented the same characteristics as the specimen of the ten-grain solution, except that the stronger the solution of chloral the smaller was the organic deposit, and the specimen in the sixty-grain solution was contracted and somewhat diminished in size, owing, I suppose, to the astringent properties of the chloral.

On the 2d day of August I again examined the specimens,

and could discover no change in them since the 5th of May. These experiments seem to confirm the assertion that chloral hydrate possesses powerful antiseptic properties; but we will now hear what others have to say on this subject. First, we have the report of my friend, Dr. White, who writes as follows:

RICHMOND, VA., June 9th, 1875.

MR. T. ROBERTS BAKER.

DEAR SIR: In accordance with your request I herewith submit a report of my experiments with chloral hydrate as an antiseptic. On the 15th of December, 1874, I prepared three adult subjects for the dissection of muscles, using as an antiseptic injection one pound of chloral, two pounds of starch, and seven gallons of water, which was equally divided between the three subjects, or two and a half gallons of the fluid to each. Two of the subjects were aged, and in consequence the muscular tissue was pale, but in the third, a young adult with good muscular development, the muscles were beautifully red, and in every respect perfectly satisfactory. I make mention of this difference of color to draw attention to the fact that the chloral exerted no influence on the color of the tissues. The dissecting-room was kept at a variable temperature, a warm fire being kept in the room during the hours of dissection, and then permitted to die out, when the temperature would sometimes fall below the freezing-point. The dissections were continued until January the 11th, 1875, four weeks, and during the whole period the tissues remained firm, and remarkably free from disagreeable odor, notwithstanding there was a week of damp, thawing weather in the interim. On January the 11th the brain was removed, and found to be in a perfect state of preservation; on the same day a piece of muscular tissue from the younger subject, looking like a piece of fresh beef, and free of disagreeable odor, was placed in a solution of chloral hydrate six grains to the ounce, and handed to you.

I feel satisfied, from these experiments, that chloral hydrate possesses antiseptic properties in an eminent degree, and is well suited to anatomical purposes, and also that it is free from the disadvantages of many of the agents heretofore in use, such as the discoloration produced by chloride of zinc, and the soreness under the finger-nails which sometimes annoys the dissector when arsenic is used.

Very respectfully,

ISAIAH H. WHITE,

Demonstrator of Anatomy,  
Medical College of Virginia.

The piece of muscular tissue which was handed to me by Dr. White, had previously been placed in a pint wide-mouth glass-stoppered jar, and I placed this specimen on the shelf with those which I had prepared. When examined on March 9th, 1875, it had a faint odor of putridity, and at the expira-

tion of another month the smell was so disagreeable that it was given to my servant with instructions to bury it. But it must be remembered that this specimen, unlike the samples of mutton with which I was experimenting, was a portion of a dead body in which the process of decomposition had probably commenced when the subject was carried to the dissecting-room.

Doctor W. W. Keen, lecturer on anatomy in the Philadelphia School of Anatomy, says in a communication to the Philadelphia Times, "that having seen in some journal that chloral hydrate was an excellent antiseptic, and having a case of caries of the tibia, he concluded to try it. The result being successful, he tried it in a number of cases, and then made the following experiments with it: I. October 22d, 1873, placed some mutton with pure water in a bottle, corked it loosely, and allowed it to remain on my office table, exposed to a temperature night and day averaging 65° F. In four days it smelt very badly, and in seven it was disintegrated.

"II. Same date. Mutton in a solution of chloral hydrate two grains to the ounce of water under similar conditions. November 1st, ten days, slight mould. December 8th, forty-eight days, slight odor. December 25th, sixty-five days, entirely decomposed. Experiments III to VI. Mutton placed under similar conditions, October 22d, 1873, but in chloral solutions of 5, 10, 20, and 60 grains to the ounce of water respectively. March 12th, 1874 (141 days), or nearly five months, they are all perfectly preserved, with no smell save that of mutton fat and chloral; no mould, no disintegration. A microscopic examination showed that the muscular structure was perfectly preserved in all of them.

"A condyloma, removed December 24th, washed for twenty-four hours in water, and placed, on December 25th, in a forty-grain solution of chloral: March 12th, 1874, is still perfectly preserved. Encouraged by success, I obtained a foetus, still-born at full term, and injected it December 10th, 1873, as follows: one arm of the brachial artery, precaution being taken, of course, to limit to the arm, with a five-grain solution; the other arm with a ten-grain solution; one leg by

the femoral artery with a twenty-grain solution, the other leg with a forty-grain solution, and by the umbilical cord, the trunk and head with an eighty-grain solution. I used in all two ounces of chloral, and injected as much as I could, so that the skin was fully stretched, as if the part were extremely dropsical.

"Here was a complete comparative experiment, for all parts of the foetus were exposed to the same conditions, except the strength of the injections. I then left it exposed on a table in a room of average temperature of 50° to 60° F. March 10th, just three months later, I examined it carefully. The body appeared perfectly preserved. The skin was shrivelled a little about the finger nails, lips, eyelids, and scrotum, from evaporation; the toes were as plump as ever; the epidermis was slightly loosened. The head and neck, which were very much congested and discolored when received (a consequence, doubtless, of its being still-born), were of the same dark color, but no decomposition had ensued; and the common toilet pins with which I had closed the incisions by which I reached the arteries, were perfectly untarnished. On opening the parts injected with the 5, 10, and 40-grain solutions, and examining them, they all appeared as firm as ever, all of natural color and consistence, and the microscope (one-fifth) exhibited no change in the muscular structure, even with the five-grain solution. In order, however, to have a more careful examination, I gave Dr. Richardson a scrap of muscle from the ball of the thumb in the five-grain arm, another from the twenty-grain thigh; a slice of the tongue (which, as the mouth was open, had become partly dried), and a piece of the parotid gland. He kindly examined them with great care, with a one twenty-fifth inch in immersion lens, eye-piece A giving 1250 diameters, and reports as follows: A small piece of muscular tissue from the palm of the hand (five-grain solution), teased out in a drop of chloral solution, showed the individual fibres with remarkable distinctness, the transverse striations being unusually well defined, and the whole structure quite free from granular or other degenerative change. A similar fragment from the thigh injected with a twenty-

grain solution, was admirably well preserved. A thin section from the tongue exhibited muscular fibres in the same state of preservation, and in these by the aid of acetic acid, the oblong and rectangular nuclei under the sarcolemma were clearly brought into view. A minute shred snipped out from the upper surface of the tongue displayed the filiform papillæ very distinctly, and furnished numerous cells of tessellated epithelium in a drop of fresh saliva. A thin section from the parotid gland showed the lobules of the glandular tissue almost unaltered, and on the addition of acetic acid the usual sharp definition of the muscles in each gland cell was obtained."

Dr. Keen then relates the case of a negro who died in the city, on the 18th of February, and lay exposed during the warm weather which prevailed at that time until February the 28th, when he was brought to the dissecting-room. He says a more unfavorable subject for preservation he has rarely seen. Though a large man, he injected the subject with chloral solution, fifteen grains to the ounce, and on March the 12th, twelve days afterwards, and twenty-two days after death, he is in a perfect state of preservation. The disagreeable odor is gone, and a specimen of muscular tissue taken from the abdominal walls (the most unfavorable part of the body) is of admirable color and consistence.

But Dr. Keen says he does not yet claim that chloral will answer for the dissecting-room to the exclusion of everything else, as his experience only embraces a period of five months during a mild winter, and he wishes to witness the effect of the hot summer months; but thus far he claims its entire superiority in the winter for all dissection, and especially for the finer and more delicate experiments of the skilled anatomist. He then sums up its comparative merits as follows: 1st. Cost. The cost will be from fifty cents to one dollar for each subject. Chloride of zinc or arsenic cost about fifty cents for each subject. 2d. Condition of the tissues. Chloride of zinc hardens, discolors, and decolorizes the tissues to such an extent that for both dissection and operative surgery they are rendered totally unfit to give the student the proper idea of

their normal color and consistence. Besides this, many parts, such as the axilla, with its entanglements of bloodvessels, nerves, muscles, glands, etc., important to be well dissected, are in such a discolored, dirty condition, as hopelessly to bewilder the most earnest student. Arsenic is better than zinc, but the tissues become very soft and offensive in a little while, besides the frequent annoyance of local poisoning about the finger-nails. Salt and nitre have the same objections, except the poisoning, and are also liable to mould in a short time. Chloral keeps the color perfectly, and the parts are of their natural consistence for at least three months, and probably for a much longer time. By the use of chloral far more delicate and useful dissections can be made, and the student has a correct idea of the condition of the parts just as they were in life. 3d. Subsequent injections can be made with far better effect, since none of the arteries are at all contracted as they are by the astringent action of the zinc; and the injection will, therefore, penetrate much farther. 4th. The destructive action of zinc in dulling the edge of the best knives, and thus worrying the dissector by the constant use of the hone, is well known. Chloral does not affect the knives in the least. Dr. Keen also tested the antiseptic and deodorant properties of chloral in a number of surgical cases, and found that weak solutions, say five or ten grains to the ounce, would, in a few hours, deodorize very offensive ulcers, and at the same time promote a healthy condition of them, quickly changing foul, ill-smelling discharges to healthy-looking sores, and in every case greatly diminishing the discharges from them.

Dr. Stoddart, of Bristol, England, in an article published in the Medical Press and Circular, says he examined the stomach, lungs, heart, spleen, and kidneys of a patient who died from an overdose of chloral, and was struck with the very extraordinary way in which the several portions were preserved. Although more than a week had elapsed since death, yet not the slightest sign of decomposition had taken place, nor was there any unpleasant odor.

The antiseptic effect of chloral hydrate has been ascribed

to the neutralization of the alkalinity produced during putrefaction, and also to the probable fact that the chloroform liberated excludes atmospheric oxygen, and destroys the vibriones.

It is stated that 100 grains of Schering's chloral hydrate, decomposed with caustic alkali, will yield 60 grains of chloroform; and in a paper read by Prof. Maisch at the Twenty-first Annual Meeting of the American Pharmaceutical Association, on the reaction of chloral hydrate, it seems to be satisfactorily demonstrated that chloral hydrate has a decided acid reaction.

I have, therefore, arrived at the following conclusions: 1st. That chloral hydrate does possess powerful antiseptic properties. 2d. That it may be successfully used for the preservation of anatomical preparations; and also that comparatively weak solutions will afford the most satisfactory results.

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## IODOFORM.\*

BY HANS M. WILDER, PHILADELPHIA.

QUERY 21.—What is the most desirable process for making iodoform; how can it best be dispensed; and how can vessels, in which a preparation of it has been made, be quickly deodorized?

### PROCESS.

AFTER trying various short-cuts, principally with a view to avoid the use of alkalies (which appropriate at least five-eighths of the iodine), all of which proved abortive, I decided on two of the old processes, those of Filhol and of Bouchardat. Which one to recommend depends on what is understood by *desirable*. If an easy process is wanted, giving a fair yield, then I must recommend Bouchardat; if, however, the greatest stress is laid on the yield, then Filhol's process takes the lead of all others.

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\* Read at the fifth session.





If the Committee on Revision of the Pharmacopœia, 1880 (83), should decide on Filhol, I would take the liberty of calling its attention to Prof. Mayer's improvement of Filhol, and to Rother's process (see both below), both seeming to be easier to follow.

I followed Hager's directions, as found in his Commentary.

*Bouchardat.*

Put 100 parts of iodine in a comparatively large long-necked matrass or flask; add 100 parts of bicarbonate of potassium, 1200 parts of distilled water, and 250 parts of alcohol, and insert a cork, through which passes a long glass tube. Heat in a water-bath, not too quickly, till about 176° F., and add, after decoloration of the liquid, 25 parts of iodine. Repeat this with 20 and 10 parts, waiting with each addition till the liquid has lost its brown color. If iodine should happen to be a little in excess, add cautiously liquor potassæ till decolorized. Now pour the liquid into a porcelain capsule, cover, let stand twenty-four hours, throw on a filter, and wash the sediment with cold distilled water. The iodoform is now spread out on folds of bibulous paper, and dried in the open air (better under a bell-jar with sulphuric acid).

Hager recommends now to evaporate the filtrate to dryness, calcine with charcoal, and extract the iodide of potassium with diluted alcohol. As this is quite troublesome, I concentrated the filtrate by evaporation, and decomposed the iodide and iodate with nitric acid in excess. Iodine is precipitated as quite a fine black powder, and washed with water.

As to the yield, Hager states the highest yield obtained by him to be 35 per cent. I did not succeed in getting more than 28 per cent., the regained iodine amounting to 62 per cent., thus leaving 10 per cent. of iodine to be accounted for. It is true that there always will be some loss of iodine, chiefly through formation of iodide of ethyl, but 10 per cent. is entirely too much, and probably to be ascribed to the small quantities I operated with.

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*Filhol.*

Put into a similar matrass or flask a solution of 200 parts of crystallized carbonate of sodium in 1000 parts of distilled water; add 100 parts of alcohol, and heat in a water-bath to  $140^{\circ}$ – $160^{\circ}$  F. Now add gradually 100 parts of iodine (about 10 parts at a time). When the brown coloration of the liquid has disappeared, remove the flask from the water-bath, and throw, after three to four hours, on a filter. Return the filtrate to the flask; add 200 parts of carbonate of sodium, and 100 parts of alcohol; heat to  $160^{\circ}$  F., and pass a slow\* current of chlorine gas through the mixture, as long as not only iodine is separated, but also the brown liquid again decolorized. (Hager states that every 100 parts of iodine require the chlorine which can be evolved from about 200 parts of muriatic acid by means of manganese. Since both substances have merely a nominal price, I took *quantum satis*, of course, watching the effect. A small excess of chlorine is of no consequence.) Let the flask stand twenty-four hours; throw the contents on a filter, and examine with chlorine water whether the filtrate still contains an appreciable amount of iodine compounds; then, if necessary, subject the filtrate to a second treatment of chlorine, adding previously only 20 parts of carbonate of sodium, and 10 parts of alcohol; collect the iodoform after twenty-four hours. The filtrate may be concentrated and decomposed by excess of nitric acid as above.

The collected crystals of iodoform are now well washed with the smallest quantity of cold distilled water, spread out on layers of bibulous paper, and dried in the open air.

Respecting the yield, Hager states that, with the utmost accuracy, he did not obtain higher than 72 per cent. In two different operations I succeeded in getting 42 and 53 per cent. The regained iodine amounted to 40 and 35 per cent., thus leaving 18 and 12 per cent. unaccounted for.

I have to make the same remarks as on the loss by Bou-

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\* Here Hager deviates from Filhol (Jour. de Pharm. et de Chimie (8), vii, p. 267, etc.), who directs to use a *rapid* current.

chardat's process, being confident that, on working with proportionately large quantities, the unavoidable loss will be greatly reduced.

#### ADMINISTRATION.

For *internal* use powders and mixtures would seem to be out of question, when its disagreeable odor and taste be remembered. If it is necessary to administer it in the liquid form, this can only be done in the form of drops (for instance, 1 part to 4 parts of ether), which must, moreover, be kept in a red or orange-colored bottle, else it decomposes.

As to pills, nothing particular is to be observed; it is not worse to manage than, for instance, powdered iron.

For *external* use we have suppositories and ointment. The suppositories are best made by hand (Kennedy's cold process, *Am. Jour. Pharm.*, xlvii, p. 55). For ointments, rub smooth with a little sweet oil.

It has been recommended by Righini (*Am. Jour. Pharm.*, xxv, p. 472) as an antiseptic, by coating strips of paper with a paste made from 1 part of iodoform, 2 parts of starch, and sufficient water, the strips to be hung about the room.

#### DEODORIZATION.

The best way is to apply an *alcoholic* solution of potassa, and rinse well with water after about half an hour. If there still should cling any odor to the mortars, etc., I have always found it to be best removed by bichromate of potassium with concentrated sulphuric acid, adding one-half water, afterwards rinsing.

Having thus answered the query to the best of my ability, I think that, as a set-off to my ill-success in devising a brand-new process (for instance, with electricity, ozone, permanganate of potassium, or what else), a short *résumé* of the different processes may not be out of place. It is, of course, unnecessary to state that I am largely indebted for many of the following facts to that treasure-trove of chemists, Gmelin's Handbook.

## HISTORY.

Iodoform, iodide of carbon, iodomethane, methenyl iodide, formyl iodide, etc.,  $C_2HJ_3$ , was discovered by Serullas, 1822.

The different processes may conveniently be classified as follows:

I. Iodine, aqueous alcohol, and caustic alkalies.

II. Iodine, aqueous alcohol, and mono- or bicarbonates of alkalies.

III. As II, but liberating the iodine from the formed iodides and iodates by chlorine.

*I. With Caustic Alkalies.*

Serullas, who first obtained it by the action of alkali metals on an alcoholic solution of iodine, soon became convinced that the said metals acted only after first having been converted into alkalies. The only process which deserves mention is that of Ferrari and Trisiani, who distil the mixture of iodine, potassa, and alcohol. It is evident that the obtained iodoform must be very pure.

*II. With Carbonates or Bicarbonates of the Alkalies.*

Mohr proved that the amount of iodine made unavailable (by combining with the alkali) is less by using mono- or bicarbonate.

Authors deserving mention are: Mohr (5 carb. pot., 6 iodine, 6 alcohol, 12 water), Wittstein (2 carb. pot., 2 iodine, 1 alcohol, 5 water), Bouchardat (mentioned above), and Cleary, who tried all processes and reported the yield (*Jour. de Pharm. et de Chimie*, 1844, vi, p. 51), Bouchardat, 12 per cent.; carbon. potash, 10 per cent.; potassa, 8 per cent.; bi-carbon. sodium, 10–15 per cent.; carbon. sodium, 11 per cent.; soda, 8 per cent.; ammonium, 6 per cent.; carbon. ammonium, 12 per cent.; acetate of potash and a little ammonia, 15 per cent.

*III. With subsequent Treatment with Chlorine Gas.*

The only author who applied chlorine gas to liberate iodine

from its salt is Filhol (see above). (Ibid., 1845, vii, p. 267.) In further experimenting, he found that the following proportion is capable of yielding iodoform in the cold (10 iodine, 20 carbon. potash, 10 iodide of potassium, 10 alcohol, 200 water).

Cornélis and Gille have tried to improve upon Filhol's process by using iodide of potassium and chlorinated lime. (Ibid., 1852, xxii, p. 196.) They report a yield of 40 per cent.

Poulenc (ibid., p. 361) proposes to combine the processes of Bouchardat and of Cornélis and Gille by commencing according to the former, and treating the filtrate with chlorinated lime, as the latter authors.

F. F. Mayer (New York) proposes (Drug. Circ., 1867, p. 111, 2d column) to substitute the chlorine by hypochlorite of soda, saturated with iodine or iodide of potassium, which is added to the first filtrate (previously acidulated with muriatic acid), and then adding carbonate of sodium and alcohol as usual.

Rother (Chicago Pharmacist, vi, p. 857), with the same end in view as Filhol (or rather Mayer), starts from Wittstein's process (see above), and gets free chlorine by acting with bichromate of potassium upon muriatic acid. He improves upon all his predecessors by adding fresh iodine to each mother liquor (besides carbonate of potassium and alcohol), thus giving an infinite process, which can be carried on until the accumulation of salts becomes too great.

E. Smith (London Pharm. Jour. and Trans. (3), v, p. 211) follows Wittstein, but decomposes the filtrate, neutralized with nitric acid, with nitrate of lead.

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## ON THE QUALITY OF COMMERCIAL ETHER.\*

BY P. W. BEDFORD.

QUERY 2.—Is the ether obtained from manufacturing chemists as pure and strong as the Pharmacopœia directs, and what are the usual impurities?

ALTHOUGH the Pharmacopœia gives officinal formulas for the production of both ether and stronger ether, the manu-

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\* Read at the sixth session.

facture of this has gone entirely into the hands of manufacturing chemists. The query seeks information as to whether such ether is of as good quality as it should be.

To answer this we need only to apply the tests given by the Pharmacopœia.

As found in our markets, there are three varieties of ether which find sale, and are known as commercial ether, or sulphuric ether, washed ether, and concentrated ether, the latter article being intended to correspond to the ether fortior of the U. S. P.

None of the ordinary or commercial ether should ever be used for the purpose of producing anæsthesia, yet they are not unfrequently sold and used for this purpose. The ether fortior of Squibb's manufacture, as also all of the concentrated and one of the washed ethers, is sufficiently pure to quickly produce etherization of the patient.

The impurities most likely to be met with in any ether are alcohol, water, ethereal oil, and foreign odors arising from impurities in the alcohol used or produced by carrying the process too far.

The tests employed were specific gravity, removal of alcohol by treatment with water, testing for free acid, and the odor when evaporating.

The greatest difficulty experienced was to obtain the specific gravity correctly, but with some trouble this was finally accomplished, and the writer believes that his results are perfectly accurate. As ether and alcohol expand considerably more than water at the same temperatures, it was taken at 60° F., the use of an accurate standard thermometer being necessary.

I am informed by Dr. E. R. Squibb, that as the result of many careful experiments, he gives absolute ether the sp. gr. of .70965 at 77° F., .71900 at 60° F. As ether fortior contains a portion of alcohol, and the alcohol always retains a small percentage of water, the specific gravity of this mixture is proportionately greater.

The U. S. P. states that ether should have the sp. gr. of .750, and when agitated with an equal bulk of water, should

not lose more than one-fifth to one-fourth of its volume, while ether fortior should have the sp. gr. of .728, and lose not over one-tenth to one-eighth of its volume when treated with water.

By referring to the annexed table the result of these tests may be seen.

All of the specimens examined were entirely free from acid, possessed no odor which would render them objectionable for their respective uses, viz.: Ether fortior of Squibb, concentrated ethers of the other makers examined (and the washed ether of Powers & Weightman) are adapted for producing anæsthesia. Washed ether and commercial ether should only be used for manufacturing purposes. In one particular it would be well to add a word of caution; any ether which has a greater specific gravity than .735, or when treated with an equal bulk of water loses more than one-fifth of its bulk, should never be used to produce anæsthesia.

	Specific gravity at 60° F.	25 c.c. mixed with water, was reduced in bulk to ... c.c.	Percentage dimi- nution of bulk.
Ether fortior; Squibb's, . . . . .	.7270	22.2	11.2
“ concentrated; Powers & Weightman,	.7808	21.6	18.6
“ “ C. Pfizer & Co., . . .	.7251	22.8	10.8
“ “ C. Cooper & Co., . . .	.7267	22.	12.
“ washed; Powers & Weightman, . .	.7299	21.8	12.8
“ “ O. Pfizer & Co., . . . . .	.7489	18.5	26.
“ “ C. Cooper & Co., . . . . .	.7404	19.5	22.
“ commercial; Powers & Weightman, .	.7568	16.6	88.6
“ “ C. Cooper & Co., . . . . .	.7579	16.5	84.
“ “ O. Pfizer & Co., . . . . .	.7808	18.6	45.6

In the above table will be found the specific gravities of the ethers of the market at 60° F., the volume to which 25 c.c. were reduced after frequent agitation with water for half an hour, and the percentage diminution of the volume of ether when thus treated. The latter does not fairly represent the

amount of alcohol which is present in the ether, as the more alcohol there is in the ether the more soluble ether is in the mixture of alcohol and water, so that the percentage diminution of the volume of ether is not a correct index of the amount of alcohol present, though it is quite an approximation to it.

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### ON PANCREATIN.\*

BY EMIL SCHEFFER, LOUISVILLE, KY.

QUERY 88.—Is pancreatin converted into pepton, when it is digested with acidulated pepsin?

THE answer to this query requires as first desideratum a pancreatin which possesses all the properties of the normal pancreas secretion, and as the pancreatins of the market could not be relied on in this respect, such had to be prepared.

According to physiological authorities the pancreas secretion, when taken from living animals, is a clear, almost colorless, somewhat viscid liquid, of neutral and sometimes alkaline reaction; it froths considerably upon agitation, is coagulated by heat, and is precipitated by strong acids and alcohol. The white precipitate produced by the latter is soluble in water.

The watery solution of the alcohol precipitate, as well as the normal pancreas secretion, have the property to convert starch into sugar and to decompose neutral fats into glycerin and the corresponding acids. It is also supposed to have the power of emulsifying fats, and Bernhard, Kölliker, and A. Miller found the normal secretion to possess this property in a high degree (by forming with oil a very perfect emulsion).

Other physiologists, however, do not regard this property very important, as they find that other secretions of the animal body possess it in the same if not in a higher degree.

We must, therefore, consider the saccharification of starch and the decomposition of neutral fats as the paramount functions which the pancreas secretion has to perform in the

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\* Read at the fifth session.

animal economy, and for these two qualities we have particularly to look in pancreatin.

The old method, mentioned in physiological works, to precipitate the clear watery extraction of the pancreas with alcohol, to treat the precipitate with water, and precipitate from the clear filtered solution the pancreatin with alcohol again, yields, no doubt, the best dry preparation, as it possesses the power to saccharify starch and to decompose neutral fats in the highest degree.

The rapid putrefaction of the watery pancreas extraction, the slow process of filtering it, and the large quantity of alcohol needed, suggested to me a slight modification of the above process, by which I obtained a product which showed all the characteristic reactions of the pancreatic secretion, and by which I prepared the pancreatin used for my experiments.

A watery pancreas extraction gives with the first drops of hydrochloric acid added to it, a permanent precipitate, but when the pancreas is extracted with slightly acidulated water, the albuminous substance which causes the precipitate upon the addition of a little acid to the watery extraction, is not extracted. If to the solution in acidulated water hydrochloric acid is now added in small quantities, a precipitate is formed which redissolves again, but remains permanent upon addition of acid in excess.

Fourteen ounces well cleaned and finely chopped beef pancreas are macerated in one quart of water, to which one drachm of hydrochloric acid is previously added. After twenty-four hours the liquid is strained off, and the pancreas macerated with one pint of water without acid for about four or six hours; the liquid obtained from this second maceration is mixed with the acidulated extraction and filtered. The filtration is rapid and results in a perfectly clear liquid of a light-yellow color and slightly acid reaction, which is coagulated by heat, precipitated by alcohol, and which when added to a thick starch-paste, thins it in a short time even at a temperature of seventy to seventy-five degrees, and formation of sugar can be proven in it in copious quantity by Trommer's test.



To the clear slightly acid liquid is now added an excess of freshly precipitated carbonate of calcium, to perfect neutralization. The neutral liquid is filtered and mixed with an equal volume of alcohol at 95 per cent., by which a copious white precipitate is formed, which is collected on a filter, and after all the liquid has drained off is washed with dilute alcohol. Pressed and dried between bibulous paper the pancreatin appears then as a transparent, brittle, yellow mass, which dissolves in water slowly but almost entirely, leaving, when prepared in cold weather, only a trace of insoluble matter.

The filtered solution is perfectly clear, of a slight yellowish color, neutral, and produces when heated a copious curdy precipitate; with alcohol it turns quite white and forms a heavy precipitate. Saturated solution of chloride of sodium does not precipitate it, but forms a clear solution; hydrochloric acid gives a precipitate which at first redissolves, but when added in larger quantity remains permanent.

Chloride of sodium solution added to an acidulated solution forms immediately a white precipitate, and, *vice versâ*, hydrochloric acid when added to a clear mixture of pancreatin solution and chloride of sodium, forms a permanent precipitate. With oil the pancreatin solution forms by longer agitation a smooth emulsion which soon separates. Starch-paste becomes by addition of pancreatin solution, when exposed to 100° F., in a short time very thin, and Trommer's test shows plenty of sugar.

From neutral fats the pancreatin separates the corresponding acids, which was proven by the following experiments:

To powdered pancreatin, mixed with a little water to a soft paste, a few drops of monobutyrin were added; after some time, according to the temperature of the air, the aromatic odor of monobutyrin disappeared, and some time afterwards the strong odor of butyric acid was noticed, while at the same time blue litmus-paper was deeply reddened.

To a solution of five grains of pancreatin in two drachms of water, two drachms of pure olive oil were added, which mixture formed by agitation a kind of emulsion, after twelve

hours a half ounce of absolute alcohol was added and the vial vigorously shaken.

Having found previously that the olive oil showed a slight acid reaction, I had in another vial two drachms of olive oil and two drachms of water shaken together, to which also a half ounce of absolute alcohol was added. The alcoholic solutions of both vials were put on separate filters and tested; while the solution of olive oil produced on litmus-paper only a faint reddish coloration; the other solution in which the oil had been in contact with pancreatin, reddened the litmus paper very bright, and, furthermore, the latter gave by evaporation of the alcoholic solution at least four times as much residue of strong acid reaction as the pure oil solution.

The third and most convincing proof is the following: To one ounce of neutral pancreatin solution (twenty grains to one ounce of water) two drachms of lard, which I had rendered on the water-bath from fresh leaf-lard, were added. This mixture, perfectly neutral, was at first occasionally agitated; on standing the lard collected on top again; after longer agitation the lard commenced to swell and become whiter; by more constant agitation the fatty layer increased in bulk until at last the whole was transformed into a uniform white spongy mass, from which, in rest, a part of the watery liquid separated. At the same time the mixture was occasionally tested with litmus-paper. At first quite neutral, it reddened blue litmus after the lard had commenced swelling, and by the time the spongy mass was formed, the litmus-paper was deeply reddened.

The acidification of the lard seemed to go hand-in-hand with the emulsification, if, indeed, the spongy mixture can be called an emulsion.

After eighteen hours, by which time the greater part of the watery liquid had separated, the entire mass was transferred to a moistened filter, and the fatty substance washed with water repeatedly. After the water had drained off as much as possible, the filter with fatty contents was put into a beaker and alcohol of 0.835 specific gravity added, which became immediately strongly acid. The alcoholic solution was after

a few hours filtered off from the insoluble fat, and evaporated on a water-bath, whereby a considerable quantity of fatty acid was obtained.

The chemical and particularly the physiological tests enumerated above, vindicate for my preparation the name of pancreatin.

In the American Journal of Pharmacy, November, 1873, Mr. R. V. Mattison published a formula for a preparation he obtained from pancreas, which he, therefore, called pancreatin. If under pancreatin that substance is understood which has the properties of the normal pancreas secretion, then Mr. Mattison's preparation cannot be and is not pancreatin; it has neither the chemical nor the physiological properties which characterize pancreatic secretion. Its solution in water has an acid reaction; is not coagulated by heat nor by alcohol; carbonate of calcium added to the solution, precipitates the greater part, proving its insolubility in the neutral state; the liquid obtained by filtering off the precipitate gives, with alcohol, a little precipitate hardly soluble in water. Neutral monobutyrin added to it does not show any odor of butyric acid. Starch is not converted into sugar. Its solution shaken with oil forms a kind of emulsion, which soon separates, and which, by closer inspection, is nothing but an aggregation of minute oil-globules, which, under the magnifying-glass, appear of a transparent yellow color. The same emulsion is obtained when an acid pepton solution, obtained by dissolving albumen in pepsin solution, or when a solution of the precipitate, obtained by chloride of sodium from the pepton solution, is shaken with oil; and as this so-called pancreatin forms, with sulphate of copper and caustic potash, a deep purple-colored solution, I am of opinion that it consists principally of pepton.

I obtained the same substance by adding to a solution of my pancreatin hydrochloric acid, drop by drop, as long as the precipitate redissolved, and then the same volume of saturated solution of chloride of sodium. The heavy precipitate formed was washed with dilute chloride of sodium solution, and proved to be exactly the same substance as when pre-

pared directly from pancreas by Mr. Mattison's formula. It did not decompose monobutylin; did not convert starch into sugar; and gave, with Trommer's test, a dark-purple coloration. The acid liquid, filtered off from the chloride of sodium precipitate, was neutralized with carbonate of calcium, and to the filtered neutral liquid alcohol of 95 per cent. was added. A small flocculent precipitate was formed, which did not decompose fat.

By the action of hydrochloric acid on the watery pancreas extraction, particularly when the quantity of acid is considerable, and when the temperature is elevated, the pancreatin is destroyed.

A solution of pancreatin, which showed the saccharifying property in the highest degree, lost its action on starch after it was exposed to 100° F. for several hours, with the addition of five drops of hydrochloric acid to the ounce. It had no action on starch neither in the acid state nor after being neutralized with carbonate of calcium; the filtered solutions giving, with Trommer's test, only a reddish coloration, but no precipitate of suboxide of copper.

But to recur to the real question: Is pancreatin converted into pepton by the action of pepsin? or, in other words, can pancreatin, when brought into the stomach, have any physiological and therapeutical effect?

Some experiments which I have mentioned before answer this question already to some extent; but the following experiments will prove the destruction of pancreatin when acted on by pepsin:

a. One ounce of chopped pancreas was added to a solution of one-half grain pure pepsin in three ounces of acidulated water; after six hours' digestion, at 100° F., the liquid was filtered off from the undissolved portion, and neutralized with carbonate of calcium. A portion of the neutral liquid was added to starch-paste, and the vial containing it exposed to 100° F. for some time. Trommer's test produced only a purple-red coloration, but no precipitate of suboxide of copper. The balance of the neutral liquid was precipitated with alcohol,

and to the washed precipitate monobutyrim added, but no odor of butyric acid could be noticed.

*b.* To a solution of one-half grain of pepsin, in two ounces of acidulated water, was added two ounces of pancreas liquid, obtained by rubbing down and beating three ounces of chopped pancreas with small quantities of water, until after the third straining four ounces of liquid were obtained, which readily saccharified starch at the temperature of the air. The pepsin solution, containing the pancreas liquid, after four hours' digestion, was filtered, neutralized, digested with starch-paste, and tested, but no sugar reaction was obtained.

*c.* To two ounces of filtered pancreas extraction was added a solution of one-quarter grain of pepsin in two drachms of water, acidulated with five drops of hydrochloric acid, and the mixture treated as described before. Neither from the acid nor from the neutralized solution, after digestion with starch-paste, did I obtain any sign of sugar by Trommer's test, while the pancreas extraction by itself, treated with starch, had given the most copious precipitate of oxidulated copper.

*d.* The experiment of *c* was repeated with that difference that only one ounce of pancreas extraction was taken, and one hundred and twenty grains of coagulated albumen added. The result was the same, except that the coloration of the liquid, by addition of Trommer's test, was deeper purple than in *c*, but no sugar could be traced.

*e.* A solution of one-quarter grain pepsin, six grains dry pancreatin in one ounce of water, with five drops of hydrochloric acid, was kept, at 100° F., six hours. To a portion of it starch-paste was added and digested for some time. Trommer's test produced afterwards a light carmine-red coloration, but no precipitate of suboxide of copper. The balance of liquid, neutralized with carbonate of calcium, was, after filtration, precipitated with alcohol, and the precipitate tested with monobutyrim, but no odor of butyric acid could be detected.

The foregoing experiments, I think, are sufficient to prove the incompatibility of pancreatin and pepsin, and, furthermore, prove the usefulness of pancreatin as a therapeutical agent, as it will be decomposed when brought into the stomach.

## VINEGAR BITTERS.\*

BY O. EBERBACH.

QUERY 81.—What is the composition of the nostrum Vinegar Bitters? An essay on the composition, with a view of exposing this fraud upon the public.

THE proprietors of one of the vilest and most unsightly-looking nostrums offered to the public, Dr. J. Walker's California Bitters, or the only temperance bitters known, as they, in their impudence, term it, seem to appreciate the well-known maxim, that the only way to sell such frauds is to advertise them, and consequently there is not a conspicuous place in the country to be found, drug stores not excepted, but what you will find their trade-mark, the triangle, with the mortar in the centre surrounded by its radiance, staring at one with the inappropriate phrases, "purely vegetable," "free from alcohol," inscribed on it, bearing the stigma of a barefaced lie, as analysis will show.

This nostrum, as found in the market, is put up in one pint bottles, wrapped up in a yellow wrapper well fastened to the bottle, on which is printed a long list of names of diseases for which they claim it to be the *sine qua non*; over this wrapper are placed two pamphlets, secured by a sheet of tissue-paper. One of the pamphlets bears the title, Crusade Temperance Almanac, with a woodcut on the first page representing an enraged woman in the act of spiking a bottle labelled rum placed on a gun-carriage. This shows well the cunning shrewdness of the proprietors to take advantage of our social conditions by offering to their victims a substitute which, as to its virtues, or more proper, its effects upon the system, is far more dangerous, and stands second to none in the line of liquors. In the writer's opinion, these hypocrites, in their disguise as friends of temperance, are to be feared far more, for as such they enter many a home (and sow destruction among the innocent members of the family seeking for relief) where liquor, owing to the contempt for it, could never have entered.

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\* Read by title at the sixth session.

This nostrum ought to be added to the railroad time-table of the line to destruction, concocted by the would-be friends of humanity as one of the surest and fastest of all trains, on the shortest route to land its victims in the grave.

The appearance of this compound reminds one very forcibly of a mud-hole in clayey soil, for it looks as if it was taken from such a depository and bottled; this probably explains why the proprietors have their wrappers so firmly fixed over their unsightly mixture. On opening the bottle it gives a slight report, indicating the presence of some gas; its odor is that of a mixture of oil of anise and aloes, its taste sour, very bitter, with an anise flavor.

The analysis was conducted in the following manner: A portion of the contents of a bottle was placed in a glass retort on a water-bath, heat applied, and the gas which was evolved in connection with the vapors, conducted through a solution of chloride of barium, made alkaline with ammonia, giving a white precipitate, this precipitate effervescing quite freely by the addition of hydrochloric acid without odor, thus proving the presence of carbonic acid; the chloride of barium solution was shaken with ether; the ethereal solution evaporated, left a small quantity of oil of anise. The retort, with its residue, was transferred from the water-bath to a sand-bath, and heated until three-quarters of the liquid had distilled over; this distillate had a strong odor of anise and acid reaction, neutralizing with carbonate of soda; it was again introduced into a retort, placed on a water-bath, and distilled to dryness; a portion of the residue was treated with alcohol and concentrated sulphuric acid, giving off the characteristic odor of acetic ether; another portion heated with arsenious acid giving the odor of kakodyl, thus proving the presence of acetic acid. A portion (1) of the distillate obtained after saturating with carbonate of soda was saturated with salt, and shaken with ether, the ethereal solution evaporated, leaving oil of anise as residue. Another portion (2) of the distillate, treated with acetate of soda and concentrated sulphuric acid, gave a feeble but decided odor of acetic ether. A portion (3) treated with bichro-



mate of potassa and concentrated sulphuric acid turned green; to four drachms of the distillate, two to three drops of caustic potassa solution (containing 10 per cent. of potassa) were added, heated to  $40^{\circ}$  to  $50^{\circ}$  C., then a saturated solution of iodine in iodide of potassium solution was added drop by drop, agitating after each addition, until the liquid assumed a slightly yellowish tinge, which again disappeared after a few minutes, then set aside for one hour, when there was a nice yellow crystalline deposit of iodoform in the bottom of the test-tube. Thus proving the presence of King Alcohol in spite of the pronounced abhorrence of the proprietor against even a drop of the poison.

The balance of the contents of the bottle was neutralized with ammonia, and evaporated to dryness on the water-bath, the residue treated with absolute alcohol until exhausted, filtered, the residue A set aside for further investigation, the filtrate placed in a retort, and alcohol distilled off. The residue B was treated with about eighty times its volume of cold water; this was repeated until exhausted. To a portion of the watery solution, dilute sulphuric acid was added, boiled for one hour, saturated with sugar of lead, filtered, filtrate saturated with dilute sulphuric acid, filtered, and again boiled for one hour; on cooling, shaken with ether, the ethereal solution evaporated, a portion of the residue dissolved in alcohol, and diluted until nearly colorless. To this was added a very dilute, nearly colorless solution of sesquichloride of iron, giving a dark golden-yellow solution, characteristic for paracumaric acid, proving the presence of aloes.

The residue B, after treating with water, was macerated with different portions of pure chloroform until exhausted, the solution set aside for further investigation. The residue was macerated with a solution of carbonate of soda, in which it dissolved, leaving but a small trace of sediment. This behavior proves the absence of colocynth and convolvulin (the active principles of jalap), and establishes the presence of resin of aloes.

The chloroform solution was evaporated, the residue macer-



ated with carbonate of soda solution, then boiled, in which it dissolved, leaving but a small trace of a black, flaky residue, filtered, and the filtrate acidulated with dilute sulphuric acid, giving a dirty, yellowish, flaky precipitate. This was collected on a filter, and washed with water, then treated with bisulphide of carbon. It showed itself indifferent; absence of gamboge. Dissolved in alcohol, and saturating strips of filtering-paper with it, the characteristic green coloration of guaiac was obtained on application of sesquichloride of iron, chlorine water, bichromate of potassa.

The residue A was dissolved in water (marked solution 1), a portion acidulated with hydrochloric acid, and then chloride of barium added gave a white precipitate, which did not dissolve on applying heat, proving the presence of sulphuric acid. A second portion treated with caustic soda was indifferent; a third portion, evaporated to dryness, left a glossy, varnish-like residue, indicating the presence of gummy matter; the residue was ignited, and part of the ashes dissolved in water; treated with caustic soda, no reaction. Another portion of the ashes, mixed with alcohol and set afire, produced a beautiful yellow soda-flame, thus proving the presence of Glauber's salt (purely vegetable, as the learned Dr. Walker was taught by his Indian tutors). Another portion of solution 1 was concentrated on the water-bath, then treated with strong alcohol, giving a copious flaky, grayish-looking precipitate; collected on a filter; a portion was dissolved in water; to a part of this solution caustic soda was added, then an alkaline solution of sulphate of copper, the mixture gradually heated to the boiling-point, and set aside; after a few minutes a red deposit of protoxide of copper was formed. Another portion of the watery solution with oxalic acid solution turned it milky (dextrin does not), a portion of the watery solution concentrated, to this a concentrated solution of sesquichloride of iron was added, gelatinizing it (dextrin does not). These reactions prove the presence of gum arabic.

Summing up the results, we find that this humbug is composed of the following rare native herbs of the West, as

lected by such Indians and associates as Dr. J. Walker, viz.: Cape aloes, Glauber's salt (it would puzzle even an expert like Flückiger to establish the source of this rare vegetable principle in the vegetable kingdom), gum arabic, gum guaiac, acetic acid, carbonic acid, alcohol, and oil of anise.

ANN ARBOR, MICH., September 7th, 1875.

MINUTES  
OF THE  
TWENTY-THIRD ANNUAL MEETING.

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*First Session.—Tuesday, September 7th, 1875.*

THE Twenty-third Annual Meeting of the American Pharmaceutical Association convened in Covenant Hall of the new Odd Fellows' Building, on Tremont Street, corner of Berkeley Street, in the city of Boston, Mass., on the afternoon of the first Tuesday of September. Shortly after the appointed time, 3 o'clock P.M., a full quorum being present, the President, C. Lewis Diehl, called the meeting to order, John M. Maisch acting as Secretary.

The President appointed Messrs. J. D. Wells, of Cincinnati; Charles Bullock, of Philadelphia; and Gustavus J. Luhn, of Charleston, S. C., a Committee on Credentials. The credentials from the delegations of the various colleges of pharmacy and local pharmaceutical societies having been handed in, the Committee retired to attend to its duties, when the President read his annual address, as follows:

**MY FELLOW-MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:**

It seems but yesterday that, in the fair "City of the Falls," I brought before you the last motion made at the twenty-second annual meeting, the motion for final adjournment. We had disposed of the usual amount of business; had received and accepted a number of reports and papers; and had assigned to various committees and members certain labors to perform during the interval of the meetings. To-day we have assembled to learn the result of these labors, to discuss their merits, and to take such action, and to

devise such measures, as may seem proper for the welfare of the Association, and for pharmacy in general. During the greater part of this week this hall will therefore bear the impress of unusual life, activity, and bustle. But the hour of adjournment will finally arrive, and what is now life and activity will have faded as if by magic. We return to our homes, and the twenty-third annual meeting of the American Pharmaceutical Association will thenceforth be one of the events of the past, to be remembered and cherished, let us hope, as one of the most fruitful of our many meetings. The fact and events of our meeting are, however, not intrusted to memory alone. On the contrary, every word that is uttered in debate or comment will be carefully recorded, to appear shortly, together with the reports and papers, in the form of a handsome volume.

While we are in attendance here, and listen to or take part in the various deliberations and discussions, their importance may not strike us very forcibly. But when what we have said and done appears in print, not only do we find much that is new and interesting, but we are also impressed with the fact that the little collected here and there has been united to form a harmonious whole. And precisely as our humble volume is created, so arrange themselves side by side, silently as do the drops of water that form the mighty stream, the scientific facts that are collected from day to day, from year to year. Restlessly as time the vast array of scientific experimenters are at work, each pursuing, apparently, a different direction, yet all of them meeting at last. Among these workers, the past has shown that none have contributed more to science than have the pharmacists, a fact that is so well established that it requires but passing allusion. It has been alleged that pharmacy is no longer the contributor to general science to the extent it had formerly contributed, that pharmacy is in its decadence, and that its claims to professional rank are lessened rather than increased. That a change has taken place in the relation of pharmacy to general science is undeniable. But a comparatively short time ago the pharmacist was dependent on his own resources for his chemicals; the rapid strides of chemistry, however, have developed methods for their preparation, which make their production on a large scale remunerative, and enable the manufacturer to furnish them in a purer condition, and at a less cost, than they can possibly be produced in the pharmaceutic laboratory. Hence the pharmacist depends upon commerce for many of the products that were formerly prepared by him, and, as a consequence, confines his attention mainly to the determination of the purity of his purchases, and to the production of galenicals. The duties involved in connection with these various operations necessitate a very thorough comprehension of the science of chemistry; and it is in their execution that the pharmacist often discovers new and interesting veins of information. The observations so made, while small in themselves, when they find their proper place, arrange themselves side by side with others, and thus form connecting links in the vast domain of chemical science. No better refutation of the charge of retrogression in pharmacy need be adduced than the annually increasing activity among pharmaceutic writers, whose writings, while they often do not possess high scientific value, nevertheless give abundant evidence of improvement rather than of retrogression in our profession.

It is expected that I should address you upon such scientific events of the past year as may be suitable to this occasion ; and the immense amount of material furnished would seem to justify you to expect a concise and faithful review of the most important events that bear relation to pharmacy. To do this properly requires more earnest attention, and a more thorough converse with the various subjects than I can claim, and I fear, did I make the attempt, I should fail to do even partial justice to you and to myself. I shall, therefore, confine my remarks to a few subjects that have prominently engaged the attention of scientists during the past year, and that bear important relation to our profession, and trust that you will judge the efforts of a simple pharmacist the more leniently, because his duty forces him to attempt those of a scientist.

Among new remedial agents, perhaps none has excited more interest during the past year than has a South American drug named

*Jaborandi*.—As is the case with most new drugs, *jaborandi* is new only in so far that the attention of the medical profession has not been invited to it sooner ; and, it is in evidence that, in Brazil and other parts of South America, this particular drug has found medicinal application for many years—perhaps for centuries—by the aborigines, before it began to be used in regular practice. The modern literature upon the subject commences with a paper, published early in 1874, by Prof. Gubler, in which he details some therapeutic experiments made at the Hospital Beaujon, Paris ; and these fully sustained the statements made by Dr. Continho, of Pernambuco—at whose request the experiments were made—that *jaborandi* possessed most powerful sialagogue and diaphoretic properties. Without attempting to give the results of the various investigations made in the chronological order of their event, I shall endeavor to place before you what has developed since Dr. Continho first drew attention to the drug.

The names "*jaborandi*," "*iaborandi*," and "*jamborandi*," seem to be generic terms which are popularly used in Brazil to designate plants that possess stimulant, sudorific, and sialagogue properties. According to Mérat and Delens, the first term, *jaborandi*, is applied solely to a species of *Gratiola*,—*G. monneria* ; while the second, *iaborandi*, is applied to all species of peppers. Margraff and Pinson already in the last century drew attention to three varieties of *jaborandi* in their "*De Medicina Brasiliensis*," and state that this name seems to be applied to various plants possessing powerful diaphoretic and sialagogue properties. It is therefore not remarkable that at least two varieties of *jaborandi* should be claimed to be the true *jaborandi* ; and it seems not at all improbable that other competitors will be brought forward. To distinguish these two varieties, it has been proposed to name the variety introduced by Dr. Continho, "*Pernambuco Jaborandi*;" and the second variety, which, according to Parodi, is used by the Indians of Paraguay, and is there known as "*yaguarundi*," "*Paraguay Jaborandi*." Parodi states that the term "*yaguarundi*" is, in the Guarany tongue, applied to various plants possessing an acrid and sharp taste ; but that the "*true yaguarundi*," that which is employed medicinally by the Indians, is a species of the pepper family. Of the two varieties,

*Pernambuco Jaborandi* has most prominently engaged attention. Prof.

Baillon, who examined the drug originally experimented with in the Hospital Beaujon, gave it as his opinion that the drug was derived from a species of the rue family, in all probability *Pilocarpus pinnatus*. Subsequently, E. M. Holmes had opportunity to examine a parcel of "Pernambuco jaborandi," and was fortunate to find several ripe fruits, which, being distinctly rutaceous in their characters, in part confirmed the conjecture of Prof. Baillon. It evidently also belongs to the tribe *Zanthoxyleae*, to which the genus *Pilocarpus* belongs; but it is not so certain that the plant from which the drug is obtained is a species of "*Pilocarpus*." It resembles in many respects a specimen of *Pilocarpus pennatifolius*, cultivated at the Kew Gardens, but differs again in others, both from this species and from the description of the genus "*Pilocarpus*," given in the "*Genera Plantarum*." On the other hand, it agrees very nearly with the description by Martius of *P. selleanus*, given in his "*Flora Brasiliensis*;" but, until an examination of the flowers can be made, the exact botanical source of "Pernambuco Jaborandi" cannot be determined.

I will not detain you with a detailed description of the botanical characters of the drug, which may be profitably studied in Mr. Holmes's paper in the January (1875) number of the London Pharmaceutical Journal, but will mention that Mr. Holmes believes the plant that yields the drug to be a shrub about five feet high, bearing pinnate leaves, about nine inches long, with from three to five pairs of opposite leaflets, and a terminal one, the leaflets having generally an oblong lanceolate outline, and, as they appear in commerce, mixed with the stems, resembling the ordinary laurel or bay leaf very closely. Their odor it is difficult to define. Rabuteau likens it to that of "dried herbs" and hay, and states that while it is faint when the leaves are intact, it becomes more manifest upon bruising them. Perhaps this definition is as good as can be given. I have found the odor of some of the leaves, contained in a glass-stoppered bottle, to be quite decided and somewhat penetrant, but cannot give it a more definite description than that of the weeds that often contaminate hay. Their taste is weak, and becomes slightly bitter after a time.

The odor of the drug is due to a *volatile principle*, obtainable by distillation with water or alcohol. Rabuteau believes this principle to be distinct from the volatile oils, while Byasson and also Gerrard regard it to be a volatile oil. Gerrard obtained it both from the stem bark and the leaves of the plant, but none of these experimenters seem to have obtained it entirely free from aqueous or alcoholic admixture, nor to have specially studied its characters. A *resinous principle* is mentioned by Byasson and Gerrard, which, Byasson states, possesses slight acidity, but no active medicinal properties; while Rabuteau does not mention it. He (Rabuteau) finds the activity of the drug to be due to a *bitter principle*, which is soluble in water, and devoid of alkalinity. Having operated with limited quantities of the leaves, however, he does not regard his experiments to be conclusive; in fact there seems to be little doubt that he is in error, since both Byasson and Gerrard have isolated an *active alkaloid*.

Byasson's alkaloid is volatile, a character which, it appears, has not been observed by Gerrard, who, operating by a method very similar to one of the

methods by which Byasson obtained his alkaloid, obtained a soft aromatic substance, apparently not well purified, from which he subsequently prepared some well-defined and active crystalline salts.

Byasson's results, although by no means conclusive, seem to point out the correct character of the alkaloid, which appears to exist in the drug in combination with an acid, the nature of which is not yet determined. The alcoholic extract of the leaves, from which the volatile oil had been distilled, was mixed with lime, evaporated to dryness, and shaken with chloroform; the chloroformic solution was distilled to dryness, the dry residue exhausted with dilute sulphuric acid, and the filtered solution precipitated with ammonia. The glutinous, flaky precipitate was purified, from accompanying sulphate of ammonium, by solution in ether, evaporation of this solution, and again dissolving in alcohol, which yielded the pure alkaloid upon evaporation. A second portion of the same alcoholic extract was mixed with lime and subjected to distillation, and a distillate, containing an abundance of ammonia, was obtained. It was shaken with ether, which yielded the alkaloid upon evaporation. As obtained by either method it is a viscous substance, possessing an aromatic odor, an acrid taste, and an alkaline reaction. The methods by which it was obtained show it to be soluble in chloroform, ether, alcohol, dilute acids, and in ammoniacal water, and that, like nicotina, it is capable of being carried over with the vapor of distilled water; but the small quantities obtained did not permit an examination of its chemical character. Byasson names it "jaborandina," but Holmes suggests that it be named "pilocarpina," since Parodi has already appropriated the name, jaborandina, to a principle which he obtained from

*Paraguay jaborandi*, to which I will now ask your attention. I have already stated that Parodi refers the plant yielding the "true yaguarundi" to the pepper family. He believes that the particular species yielding the drug is the *Piper jaborandi*, of Velloso, but describes the flowers of the plant as containing two stamens and three stigmas, whereas, the flowers of Velloso's plant contain four stamens and four stigmas; the plant yielding the Paraguay jaborandi cannot, therefore, be regarded as identified. Parodi has, however, made a very interesting chemical examination of the leaves, and the spikes containing flowers and unripe fruit, and has obtained an acrid and pungent *volatile oil*, which yielded, with hydrochloric acid, a crystalline compound. He also obtained a crystalline principle, which he has named *jaborandina*, and which seems to be a well-defined alkaloid. It was obtained by evaporating the decoction, remaining after the distillation of the volatile oil, to the consistence of an extract, extracting this with strong alcohol, evaporating the tincture, treating the residue with acidulated water, filtering the aqueous solution, and agitating it with benzin, which, probably on account of the weak affinity of the alkaloid for acids, is capable of extracting impure jaborandina. By spontaneous recrystallization from absolute alcohol "jaborandina" is obtained pure, and in the form of prismatic crystals. It possesses a weak affinity for acids, is but slightly soluble in dilute acids or in ether, but is readily dissolved by amylic or ethylic alcohol, and by benzin. The composition of its hydrochlorate, and its ultimate analysis, lead to the formula  $=C_{10}H_{12}N_2O_3$  ( $O=16$ ).

Regarding the therapeutics of jaborandi there is no evidence, beyond that of Parodi, in regard to "Paraguay jaborandi." He states that the plant possesses most powerful sialagogue and diaphoretic properties, and that it is on this account used by the Indians as a remedy for the bites of venomous serpents; the juice of the plant, leaves, tops, and root, being applied to the wound, and an infusion administered freely internally. "Pernambuco jaborandi" has, however, been very extensively experimented with, and there is no room for doubt that it possesses the therapeutic action claimed for it in a very marked degree. But there is a considerable difference of opinion in regard to its eventual value over other remedies of a like character; reliable sialagogues and diaphoretics being abundantly represented in the *Materia Medica*. While English and French experimenters seem to be very favorably impressed with its special therapeutic properties, German experimenters do not express themselves quite so favorable, and maintain that while jaborandi doubtless possesses powerful diaphoretic properties, its superiority over other remedies, usually employed as diaphoretics, cannot be recognized. A very valuable property of jaborandi seems to be its antagonism to belladonna. A case is recorded in the *London Lancet* (No. 5, 1875) in which the drug was administered, with good results, in counteracting the effect of a poisonous dose of atropia. Reciprocally, atropia has the power to arrest the sialagogue and diaphoretic effect following the administration of jaborandi. Another interesting property is its power to promote the lacteal secretion of nursing women, and also its power of contracting the pupil of the eye when applied to it; showing that in these respects also it is antagonistic to belladonna.

Jaborandi seems to be best administered in form of infusion, which may be taken cold or hot with but little difference in effect. Four to six grams, infused in a cupful of water, and administered while lukewarm, produced, after ten minutes, in the cases observed by Dr. Gubler, most violent perspiration, lasting five to six hours, and accompanied by an extremely abundant flow of saliva. Occasionally the remedy seems to induce diarrhoea.

When we consider the short time that has elapsed since the introduction of jaborandi, we cannot but admire the activity which has been developed in its examination in various directions. The chemical examination has gone hand in hand with the determination of the botanical origin and the therapeutic value, and there is little doubt but that the last-named characters of the drug will be accurately determined at a not very distant date. But we cannot look forward with the same confidence to the development of its exact chemical character; for, if we review the results of the several analyses, we observe all the elements of discord that so frequently give rise to unprofitable or tedious controversy. Do not understand me to imply that such is sought by the several investigators; on the contrary, it is the delicate nature of these investigations that make the results so variable, and that lead to erroneous observations. No more familiar illustration of the difficulty experienced in the proximate analysis of plants can be mentioned, than the numerous endeavors to determine the precise nature of the active constituent, or constituents of

*Digitalis purpurea*. It is now just thirty years since Homolle isolated from the leaves of this plant a body, which, in a concentrated form, and an ap-



parent condition of purity, represented the therapeutic properties of the plant, and which is to this day used in medicine, under the name of

*Digitalin.* Yet, notwithstanding that the accurate determination of the nature of this principle has since been the object of numerous and elaborate researches, by some of the most eminent chemists, we are to-day by no means certain of a speedy solution of the "digitalin problem," and I say this with a full appreciation of the valuable researches of Nativelle in recent years. It is my purpose to speak of the results of some recent digitalin researches, and, therefore, a review of what had previously developed will, perhaps, be of interest. The digitalin investigation may be divided into three periods.

*The first period* dates from the earliest investigations, about the year 1880, to the date of Homolle's digitalin, 1845. During this period we find prominently the names of Leroyer, Dulong d'Astafort, Meylink, Planiowa, Watson, J. Welding, Radig, Lancelot, Brault and Poggiale, B. Trommsdorff, A. Henry, and Bonjean; all of whom had endeavored to isolate the active constituent of digitalis leaves, and to determine its nature. But the substances by them named "digitalin," were either alcoholic or ethereal extracts, or precipitates obtained from solutions by the addition of acids.

*The second period* commences with Homolle's investigations of 1845, and ends with the year 1867, when Nativelle first made public his method for producing crystallized digitalin. The principal investigators of this period are, Homolle, Kossmann, Walz, Quevenne, Labourdais, Lancelot, and Nativelle.

*Homolle's digitalin* of this period is described as a white powdery, seldom scaly crystalline body, of extremely bitter taste, sparingly soluble in water, still less in ether; but freely dissolved by alcohol. It was subsequently found by Homolle and Quevenne to be composed of three distinct substances, which they named respectively, "digitalin," "digitaline," and "digitalose."

*Kossmann's digitalin* is described as identical with that of Homolle. He first recognized it to be a glucoside, which when heated with dilute acids was split into glucose and a crystallizable principle. This he named *digitalretin*, which proved to be exceedingly bitter, nearly insoluble in water, and but sparingly dissolved by cold alcohol or by ether. In boiling alcohol, however, it dissolved readily, and on slow cooling it was partly deposited, forming crystalline laminae.

*Walz*, about the same time as Homolle, and possibly previously, had produced an active amorphous and yellowish constituent, which he had named *digitasolin*. But subsequently he found his principle to correspond with Homolle's product, and named it *digitalin*. He also found that by continuous heating with dilute acids his digitalin was convertible into digitalretin, but that the primary action of dilute acids was to split it into glucose and two distinct substances, *digitaletin* and *para-digitaletin*.

*Labourdais's digitalin* was crystalline, sparingly soluble in water or ether, but freely soluble in alcohol.

*Lancelot's digitalin* was described as alkaline, but the method of its preparation seems to point to alkali as impurity. Finally,

*Nativelle's digitalin*, of this period, was amorphous, very bitter, very poisonous, freely soluble in water, scarcely soluble in absolute alcohol or ether, and contained nitrogen. At this period he also obtained a "modified digitalin,"

which was crystallizable, sparingly soluble in water, but freely soluble in alcohol.

It is evident that none of the experimenters obtained absolutely pure principles. In fact, in nearly every instance the digitalin, so-called, proved to be a mixture of at least two substances, or was convertible into such, and it is, therefore, not remarkable that recent results point very directly to the existence of two or more principles, or, at all events, to the ready change of a possible single constituent of the digitalis leaf into two or more. And this brings us to the

*Third, the present, period*, which includes the investigations during and since 1867. During this year Nativelle's paper on the production of a very active crystalline digitalin first appeared in print. At all events, I find no reference in any of the annuals of chemistry anterior to this; but it is a fact, that the formula then published had been adopted in the "Codex Medicamentarum," which appeared in Paris in 1866.

*Nativelle's digitalin* of 1867, was distinctly crystalline, and was claimed to possess extraordinary activity. He obtained at the same time an active amorphous principle, which he named *digitalein*, and claimed that the "amorphous commercial digitalin," which was then prepared exclusively by a modification of Homolle's method, consisted mainly of variable proportions of extractive and tannic acid, and of his crystallizable digitalin. Von Schroff at this time found one part of Nativelle's digitalin to be equal in therapeutic value to two and a half parts of Merck's (Homolle's) digitalin, and Lefort found both the crystallized digitalin and the amorphous digitalein, to be active therapeutic agents, bearing relation to each other in their therapeutic activity similar to the relation which quinia bears to cinchonia, the crystallized digitalin corresponding to the quinia. In the face of these observations it is difficult to reconcile the observations made by Dr. Vulpian in 1869, that Homolle's digitalin (the commercial) was more active than Nativelle's crystalline article, and Nativelle's subsequent admission that the crystallized digitalin, heretofore obtained by him, was a mixture of two colorless crystallizable principles, one of which, amounting to two-thirds of the whole, was absolutely inactive. He distinguished these two principles as "active" and "passive" digitalin; but in 1872 retained the name "crystallized digitalin" for the active product, and named the inactive, or passive article, *digitin*; while the digitalein, which had maintained its claims for activity, was named *amorphous digitalin*. Since then, Nativelle has confined his experiments mainly to the production of these principles in a pure condition, and with the exception of improvements has developed nothing new.

*Nativelle's crystallized digitalin* forms short, white, glistening needles, arranged in very light groups. It is odorless, and intensely bitter, but, owing to its sparing solubility in water, its bitterness is but slowly manifested. Ether dissolves mere traces, and in bisulphide of carbon or benzin it is completely insoluble. It is readily dissolved by alcohol, while chloroform dissolves it in all proportions.

*Nativelle's amorphous digitalin*, as described in 1867, is a white, powdery substance, which has an intensely bitter, somewhat acrid taste, and is dissolved

by water in all proportions. It is soluble in alcohol containing water; absolute alcohol as well as ether dissolving only traces.

*Nativelle's digitin* forms fine, pure white, glistening needles, arranged in pearly glistening scales. It is odorless, tasteless, and utterly devoid of medicinal action. Chloroform, ether, or water dissolves mere traces, but alcohol dissolves it freely, and its hot alcoholic solutions deposit a portion on cooling.

It is interesting that Homolle, whose original method is to this day advocated by many experimenters, believes Nativelle's crystallized digitalin to unite all that is active in digitalis leaves, and that his recent investigations support Nativelle's views completely. He finds that crystallized digitalin is not a glucoside, and maintains that a sugar reaction is evidence of impurity. Whether his views, and consequently those of Nativelle, are correct or not must be decided by future experiments; but until more positive results are obtained, results that will be incontrovertible, I am inclined to accept the views expressed in a recent paper of C. Kossmann as more correct, and, taking all the experiments made on the subject into consideration, as the most rational.

Kossmann regards Nativelle's crystalline digitalin to be a product, not an educt. By the multiplicity of manipulation the immediate principle existing in digitalis leaves is changed to the crystalline digitalin of Nativelle. This immediate principle has been successively named

*Digitalin*, *digitasolin*, and *digitaletin*, and exists in the plant in the soluble state, but is readily altered by water, by acids, or by alkalies, and hence a portion of "insoluble digitalin" is invariably contained in the plant. In its soluble condition it is a glucoside, composed of one molecule of *digitalretin* and two molecules of glucose. When it is boiled with dilute acids it primarily splits into one molecule of glucose, and one molecule of *insoluble digitalin*, which, by the further action of the acid, takes up four molecules of water, and is split into *hydrated digitalretin* and glucose. By the prolonged action of the acid the hydrated digitalretin loses its four molecules of water of hydration, and is reduced to the condition of *digitalretin*.

Both the soluble and the insoluble digitalin are exceedingly energetic agents, the former being the commercial article of Germany, the latter that of France.

Assuming this view to be correct, and there seems little room for doubt, the question might naturally arise why the apparently unprofitable labors of chemists, to determine the accurate characters of digitalin, are continued. It is not probable, however, that this question should arise among pharmacists, for we know that digitalin cannot assume its proper place in the ranks of chemistry until we understand its precise characters in all its relations; and we also know that when its molecular constitution is perfectly understood its *artificial* production is not beyond the range of possibility. We have a most beautiful example of what can be done in this direction in the artificial production of

*Salicylic Acid*.—It was a clearly established fact that salicylic acid differed from carbolic acid merely in containing two molecules more of carbonic acid, or its equivalent elements, and that when salicylic acid was exposed to a high temperature it was split into one molecule of carbolic acid, and two molecules of carbonic acid. What was nearer, therefore, than to attempt a union of

these two compounds so that the cheap carbolic acid might be made to yield, synthetically, the more expensive salicylic acid; and in this attempt, as you are doubtless aware, Prof. Kolbe, of Leipzig, has met with complete success. Before considering the remarkable results lately obtained by this eminent chemist, however, an inquiry into the sources from which salicylic acid has hitherto been obtained, and particularly into

*Salicin and some of the products of its decomposition*, will be interesting, and will, perhaps, give you a more comprehensive view of the subject.

*Salicin* is found abundantly in the barks of the willow and of the poplar, and it contributes to them their bitter taste, and their chief medicinal activity. Chemically considered, it is a glucoside, being split by continuous boiling with dilute acids into glucose and a resinous principle which has received the name *saliretin*. *Salicin*, containing  $C_{26}H_{18}O_{14}$ , glucose  $C_{12}H_{12}O_{12}$ , and *saliretin*  $C_{14}H_8O_2$ , it might be supposed that by this reaction the *salicin* is simply divided into the two last-named substances, but the reaction is not so simple. With the assimilation of two equivalents of water, the *salicin* is primarily split into glucose and

*Saligenin*, and this, upon the further action of the acid, loses the two equivalents of water again, and becomes *saliretin*. If, however, the *salicin* is subjected to the fermentive action of emulsin it is completely converted into *saligenin* without the formation of *saliretin*, and by this reaction *saligenin* is usually obtained. *Saligenin* is composed of  $C_{14}H_8O_4$ , and is chemically salicylic alcohol, bearing similar relation to salicylic acid that ethylic alcohol does to acetic acid. By the action of oxidizing agents it loses two equivalents of hydrogen, and is converted into

*Salicylous acid*, the composition of which is  $C_{14}H_8O_4$ . It is also called *salicylol*, *hydruret of salicyl*, and *salicylic aldehyde*, and as it bears the same relation to salicylic acid that ordinary aldehyde does to acetic acid, the latter name may be accepted as most suitable. It occurs naturally in the flowers of *Spiræa ulmaria*, in which it is associated with a peculiar terpen. During its preparation from this source a portion is converted into salicylic acid, and hence some writers believe salicylic acid also to be a component of the flowers. It occurs naturally also in various other species of *Spiræa*, and in the flowers of *Crepis fœtida*, and it is interesting to know that it is contained in the warty excrescences of the larvæ of a peculiar beetle, the *Chrysomela populi*, infesting willows. Upon pressing the warty excrescences the acid exudes in oily drops, and it may be readily obtained by distilling the larvæ with water. It may be obtained artificially, apart from the sources already mentioned, by the dry distillation of kinic acid, by the direct oxidation of *salicin*, by the fermentation of *helicin*, a derivative of *salicin*, and by melting coumaric acid with hydrate of potassa.

*Salicylous acid* is a colorless, oily fluid, becomes yellowish-red by exposure, but seems not to be materially changed thereby in its ultimate composition.

It retains its fluidity at zero, but at  $-4^{\circ}$  F. becomes solid, and then forms large, handsome, transparent crystals. It is moderately soluble in water, but mixes in all proportions with alcohol, and with ether. Its aqueous solutions redden litmus, and subsequently bleach it; and they are colored intensely violet upon the addition of perchloride of iron, such coloration being quite

distinct when the solution contains one part in 572,000. It is isomeric with crystallized benzoic acid, and by the action of strong oxidizing agents it assimilates two additional equivalents of oxygen, and is converted into

*Salicylic Acid.*—It follows, therefore, that all substances that can be made to yield salicylous acid, can be regarded as sources of salicylic acid. But by far the most abundant source of salicylic acid has hitherto been the volatile oil of *Gaultheria procumbens*, the oil of wintergreen of commerce, which contains about 90 per cent. of a compound of the acid with oxide of methyl, *methyl-salicylic acid or ether*, the remainder being a peculiar terpen, called *Gaultherilen*; and it is from this source that salicylic acid has heretofore been almost exclusively obtained; the oil being simply heated with concentrated solution of potassa as long as methylic alcohol thereby liberated is given off, the residue precipitated by muriatic acid, the precipitate washed with cold water, and further purified by recrystallization from alcohol. I have already stated that it is supposed to exist naturally in the flowers of *Spiræa ulmaria*, and it is possibly also contained in the sweet birch bark, *Betula lenta*, from which the late Professor Procter obtained a volatile oil which he considered identical with oil of wintergreen, and in the volatile oil contained in the root of *Polygala paucifolia*. Aside from the artificial sources already mentioned, it may be obtained by heating benzoate of copper, and by heating indigo with hydrate of potassa to 572° F.; but the latter method is not always successful, anthranilic acid being formed instead. Anthranilic acid will, however, by the action of nitrous acid yield salicylic acid, and indigo may, therefore, be regarded an additional source. But the most abundant artificial source of salicylic acid, and doubtless the one upon which we will in the future depend for its production, is the one that now so prominently engages attention, that from carbolic acid. Before passing to this, however, permit me to give a brief description of the properties and composition of salicylic acid. It is sparingly soluble in cold water, but freely dissolved by boiling water, and very freely by alcohol, and especially by ether. From its alcoholic or ethereal solutions it is obtainable in the form of large oblique, four-sided, columnar crystals; while from hot aqueous solution it is deposited in form of long and thin needles. Its solutions, like those of salicylous acid, are colored intensely violet upon the addition of perchloride of iron, but, it may be observed, that the presence of strong acids prevents or destroys this color. It melts at 318° F., without decomposition, and congeals again at 315° F. It sublimes at 392° F., and with care may be distilled without decomposition; but is very readily decomposed when heated above that point, and at a considerably higher temperature is entirely decomposed, losing two equivalents of carbonic acid, and producing carbolic acid. Its composition is  $C_{14}H_6O_6$ , and it is, therefore, isomeric with *paraoxybenzoic acid*.

The production of salicylic acid from phenol is not of as recent date as is, perhaps, generally supposed, for as early as 1860, Kolbe and Lautemann had determined that the union of carbonic acid and phenol can be effected by the intervention of metallic sodium, and even by caustic soda; but the method was too complicated or too expensive. The subject was, however, not dropped by Kolbe, and he has, finally, succeeded in establishing a method by which

the expensive metal sodium can be dispensed with, and the ordinary caustic soda used instead. Nevertheless, at the date of Kolbe's recent communication, its production from carbolic acid was nearly as expensive as from oil of wintergreen; but even under these conditions, his results must be regarded as a triumph, apart from the chemical aspect, since they have opened a never-failing source for its production. Since then the artificial acid is met with in commerce at prices far below those possible if its production depended on oil of wintergreen. I shall endeavor to give you a concise account of Kolbe's method of its production. Phenate (or carbolate) of sodium is prepared by saturating an equivalent of crystallized phenol with an equivalent of caustic soda in solution, and evaporating the compound to dusty dryness. The so-obtained phenate of sodium is heated in an iron retort by means of an oil, metal, or air-bath, gradually to 212° F. Perfectly dry carbonic acid is then passed into the retort, and the heat is gradually increased to 356° F. After a time phenol begins to distil over, and the temperature is then raised to 428° to 482° F. When phenol no longer passes over, the process is ended, and the mass in the retort consists of impure basic salicylate of sodium. A glance at the relative compositions of phenol and salicylic acid will aid in understanding the reaction which has accomplished this result. Phenol is composed of  $C_6H_6O$ ; salicylic acid contains  $C_{14}H_{10}O_6$ ; it, therefore, differs from phenol in containing two equivalents more of carbon and four equivalents more of oxygen, corresponding to two equivalents of carbonic acid. When two equivalents of phenate of sodium are heated in an atmosphere of carbonic acid, one equivalent of phenol distils over unchanged, dibasic phenate of sodium is formed, and as it forms absorbs two equivalents of carbonic acid, which is assimilated, and thus produces dibasic salicylate of sodium.

It is not my purpose to enter into detail in regard to the method of obtaining the salicylic acid from the crude salicylate of sodium. Suffice it to say, that the crude mass is dissolved in water, muriatic acid is added, the magma of crude salicylic acid is freed from the mother liquor as much as possible by pressure, and is further purified by recrystallization. It cannot be obtained entirely white in this way, and it is on this account that the commercial article is always more or less colored and has a faint odor of carbolic acid. Kolbe states that, in order to obtain it perfectly pure, it is necessary to convert it into its ethyl or methyl compound, to decompose this with an alkali, and to decompose the alkaline salt with muriatic acid. This method is open, however, to many objections, and Dr. August Rautert, who has recently obtained the acid perfectly white and odorless, found it extremely wasteful, owing to the decomposition of a large proportion at the high temperature necessary to form the ether. He finds that while the acid cannot be sublimed under ordinary conditions, it may be distilled readily in a gaseous medium at a temperature far below its melting-point; indeed, it is volatilized in appreciable quantities with the vapor of its boiling aqueous solutions. Taking advantage of this property, Rautert has devised a method by which it may be obtained abundantly and without loss in a pure white condition. The ordinary acid is placed into a copper vessel, so arranged that it can be heated by a paraffin-bath, that superheated steam can be passed over the dry acid



through a small tube, and that the vapor may escape through a larger tube into a Liebig's condenser. The paraffin is heated and maintained at a temperature of 338° F., and steam superheated to that temperature is then passed through the apparatus. As soon as the acid becomes heated to the temperature of the paraffin and steam, it volatilizes with such rapidity that the condensing tube must be kept open by means of a rod, passed up and down the tube to within the body of the apparatus, else it will in a few moments be stopped up completely. Towards the end of the operation the temperature is raised to 365° F. The product is perfectly white and only contaminated with a faint odor of carbolic acid, from which it may be completely freed by simple crystallization from solution in hot distilled water.

It is an interesting fact that phenate of barium or of calcium will also yield salicylic acid when treated in the same manner as phenate of sodium; the yield being, however, smaller. But the most surprising result has been obtained by Kolbe with phenate of potassium, which yields, instead of salicylic acid, its isomere, *paraoxybenzoic acid*.

Salicylic acid proves to be one of the most powerful antiferments known to science. The current literature is so replete with the results of experiments made in various directions upon its therapeutic and antiseptic action, that I shall close the subject with but brief remarks upon its application and uses. Its antiseptic power is superior to that of carbolic acid, over which it possesses the further advantage of being non-poisonous in its character. Hence it may be used with impunity for the preservation of food of all kinds, and the various fermented and fermentable beverages. It may be used with advantage, for the preservation of certain test solutions in the chemist's laboratory, and doubtless will find application for the preservation of many medicinal solutions, such as infusions, syrups, decoctions, etc. It prevents, arrests, or retards fermentative action of all kinds, the germination of seeds, and the growth of young plants; but it is a necessary condition that the acid is in a free state, since its salts possess no antiseptic action. As a therapeutic agent it seems destined to become of the most important value. It has been used internally with decided success in the treatment of diphtheria, as a substitute for quinia in intermittent and other forms of fever, and in the treatment of complaints arising from abnormal fermentation in the stomach or bowels. Locally it has been used with the same good effect in the treatment of various forms of disease, and especially those of an eruptive character. One of the disadvantages of its application is its very sparing solubility in water. This may be overcome by the use of phosphate or sulphite of sodium, two to three parts of which, in fifty parts of water, will readily dissolve one part of salicylic acid.

I cannot close my remarks without asking your attention to a few points connected with the general affairs of the Association, notwithstanding that this seems no longer to be expected from the Chair; and I will remark, in this connection, that the duties of the President, prescribed by Art. IX, in Chap. I of the By-laws, would be more acceptable if they had been made elective rather than imperative; and that they would have been more explicit if provision had been made that the President should also discuss such affairs of the Association as may seem to him fit and proper.

It occurs now and then that a paper, read before the Association, is not of a character suited for publication. Instead of rejecting such papers outright it has, very properly, been customary to refer them to the Executive Committee for publication, which committee is empowered to reject all papers that it may deem unworthy of insertion in the Proceedings. Unfortunately the duties of the committee in this connection are not very clearly defined, and consequently its rejecting power has been exercised but very rarely, if at all. With a view to the rigid exclusion of all papers not suited for insertion in the Proceedings, and at the same time to relieve the Executive Committee of the sole responsibility, I would recommend that all papers read before the Association be hereafter referred to a committee, composed of the chairman of the Committee on Papers and Queries, the Permanent Secretary, and the chairman of the Executive Committee, who shall decide on its acceptance or rejection, as the case may be. Under circumstances this committee might refer the paper back to the author, draw his attention to objectionable features, and leave it optional with him to make the necessary changes, or to withdraw his paper.

I desire also to make a few remarks in reference to the Committees on the Drug Market and on Adulterations and Sophistications. The subject of adulteration and sophistication seems to have been one of the primary incentives to the origin of this Association. Indeed the first President, Dr. C. B. Guthrie, on taking the chair at the initial meeting in 1851, stated that the object of the convention was "the adoption of a series of standards for the use of the drug inspectors at our different ports, whereby their action might be rendered more uniform and satisfactory; as well as proposals of any measures that might be calculated to elevate the profession, etc.;" and two years later, the year when the Association first met under its present title, a committee was appointed to consider the subject of "home adulteration." In 1857 this committee was named the "Committee on Adulteration of Drugs," and continued in force until 1862 when, for one reason and another, it was dropped. In 1870 Mr. Sargent, in his address, again drew attention to the importance of the subject, and since then we have had the Committee on Adulterations and Sophistications. The Committee on the Drug Market originated in 1862, in lieu of the Committee on Adulteration of Drugs. Reports were made in 1863 and 1864, and during this last-mentioned year it was made a standing committee. No reports were made in 1865 and 1866, nor in 1869 and 1870. Since then we have had regular reports, but I understand that there will be no report again this year. I have given the subject considerable thought during the last few months, and have arrived at the conclusion that the two committees might be profitably merged into one, namely, a committee to report on the condition of the drugs and medicines exposed for sale in various parts of the United States. I will freely admit that a statistical report of the importation of drugs, such as has occasionally been made, is of great value; but only if it is made regularly every year. On the other hand the difficulty in obtaining the necessary statistics seems to be so great that very few of our members, who are properly situated for the work, are inclined to undertake it. My idea of a useful and a working committee is this: Let



each delegation, accredited to the Association, nominate a member of the committee, and let the members of the committee choose a chairman. Then let each member organize in his locality a local committee, whose duty it should be to examine into the condition of the drug market in their particular locality, and let the local committee report through their chairman to the chairman of the "General Committee" a month or so previous to the annual meetings of the Association. The chairman of the "General Committee" would thus be supplied with the material upon which to base his report, and while, especially during the first few years, the reports of the local committees may be very irregular, an annual report to the Association will doubtless be secured, which in the course of time will become of great value, and will, under any circumstances, benefit pharmaceutic integrity and honesty. Since the establishment of "practical schools" in the majority of colleges of pharmacy very fine opportunities are provided for the investigations necessary to the success of such a plan, and it is rather surprising that we have not heard from the "practical schools," on subjects of this nature, more often than has hitherto been the case.

And with these remarks I will close, again expressing the hope that this, our Twenty-third Annual Meeting, will be recorded as one of the most successful; a result which the very bounteous preparations of our Boston friends can scarcely fail to secure.

On motion of Mr. Balluff, it was voted, Mr. C. A. Tufts taking the question, that the thanks of the Association be tendered to the President for his able and elaborate address, and that a committee of three be appointed to take into consideration and report upon the suggestions and recommendations contained therein.

The Committee on Credentials presented their report, which was read by Mr. Bullock, and, after amendment, accepted, and the gentlemen were admitted as delegates. The report is as follows:

The Committee on Credentials respectfully report that they have received the following credentials:

*Philadelphia College of Pharmacy.*—James T. Shinn, Thomas S. Wiegand, Wilson H. Pile, William McIntyre, Adolph W. Miller.

*College of Pharmacy of the City of New York.*—Paul Balluff, David Hays, Fred. Hoffmann, E. McIntyre, William Neergaard.

*Cincinnati College of Pharmacy.*—J. F. Judge, A. W. Bain, J. D. Well Herman H. Koehnken, W. J. M. Gordon.

*Massachusetts College of Pharmacy.*—George F. H. Markoe, Joel S. Or Samuel M. Colcord, William S. Folger, Daniel G. Wilkins.

*Maryland College of Pharmacy.*—N. H. Jennings, Joseph Roberts, W. S. Thompson, E. W. Russell, Edwin Eareckson; alternates, Henry A. F. J. N. Potts, J. Faris Moore, Charles S. Adams.

*Louisville College of Pharmacy.*—Emil Scheffer, C. Lewis Diehl, J. N. McAfee, William G. Schmidt, E. C. Pfingst.

*Ontario College of Pharmacy.*—Edmund Gregory, William Saunders.

*National College of Pharmacy, Washington, D. C.*—William S. Thompson, J. R. Major, Z. W. Cromwell, G. G. O. Simms, J. A. Milburn; alternates, Charles Becker, W. G. Duckett, F. D. Dowling, A. W. Reed, F. S. Gaither.

*Tennessee College of Pharmacy.*—F. Black, I. M. Safford, J. V. Jastrenski, J. C. Wardlaw, Benjamin Lillard.

*Alumni Society of the Maryland College of Pharmacy.*—Louis Dohme, E. Walton Russell, John H. Hancock, Robert Lautenbach, John Sohl.

*Alumni Association of the Cincinnati College of Pharmacy.*—E. S. Harley, A. W. Bain, C. M. Greve, Charles E. Ferris, Theodore Pellens.

*Alumni Association of the College of Pharmacy of the City of New York.*—George C. Close, Thomas Main, Edward W. Runyon, J. L. A. Creuse, Thomas Starr.

*New York Alumni Association of the Philadelphia College of Pharmacy.*—Benjamin F. Fairchild, Henry S. Wellcome, James R. Mercein.

*Alumni Association of the Massachusetts College of Pharmacy.*—J. F. Babcock, Thomas Doliber, Edward S. Kelley, W. W. Bartlett, J. S. Whall.

*Alumni Association of the Philadelphia College of Pharmacy.*—George W. Kennedy, Richard V. Mattison, H. E. Wendell, E. McC. Boring, Edward C. Jones.

*Literary and Scientific Society of German Apothecaries of the City of New York.*—G. Ramsperger, B. H. Reinold, P. F. Lehlbach, Charles Eimer.

*Newark Pharmaceutical Association.*—R. W. Vandervoort, William E. Hitchcock, E. P. Nichols, Charles H. Dalrymple, William M. Townley.

*Camden County, N. J., Pharmaceutical Association.*—A. P. Brown, Emmor H. Lee.

*New Jersey Pharmaceutical Association.*—James R. Mercein, R. J. Shaw, Charles O. Wells, E. H. Lee, Robert W. Gardner.

*New Hampshire Pharmaceutical Association.*—Charles A. Tufts, Charles F. Hildreth, William C. Vickery, George F. Underhill, Charles S. Eastman.

*Rhode Island Pharmaceutical Association.*—A. L. Calder, W. B. Blanding, F. J. Phillips, N. N. Mason, G. E. Greene.

*Vermont Pharmaceutical Association.*—Frederick Dutcher, A. W. Higgins, M. K. Paine, E. C. Lewis, I. N. Thorne, L. E. Sherman.

*Richmond Pharmaceutical Association.*—T. R. Baker, John B. Purcell, P. E. Dupuy, William H. Scott, Ira W. Blunt.

*Tennessee Pharmaceutical Association.*—H. H. Owen, A. B. Morton, J. Thomas, Jr., W. D. Kline, J. Walter.

Signed,

CHARLES BULLOCK,  
J. D. WELLS,  
G. J. LUHN.

The Secretary called the roll, when one hundred and fifteen members were found to be present.

The Executive Committee then presented the names of a

number of applicants for membership, and Messrs. E. T. Dobbins, of Pennsylvania, and Charles S. Eastman, of New Hampshire, were appointed tellers.

**MR. WIEGAND.**—There is a question to be raised on one application. One gentleman whose name is presented is not a professor in a college of pharmacy. Does our Constitution admit him?

**THE SECRETARY.**—Article I, Chapter 7 of the By-laws reads as follows: "Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of pharmacy, chemistry, and botany, who may be specially interested in pharmacy and *Materia Medica*, who, after duly considering the objects of the Association, and the obligations of its Constitution and By-laws, are willing to subscribe to them, are eligible to membership."

**THE PRESIDENT.**—The question raised is this: One of the gentlemen who has applied for membership in this Association, and whose name is reported by the Executive Committee for election, is not a pharmacist, neither is he a professor of chemistry, botany, or *Materia Medica* in a pharmaceutical school, and is not a professor interested in pharmacy. This is simply for your information, so you can guide yourselves accordingly.

**MR. BEDFORD.**—The name must be withdrawn.

**MR. WIEGAND.**—We are precluded from voting for him, unless we alter our Constitution.

**MR. BULLOCK.**—I would like to know who this refers to.

**THE PRESIDENT.**—The name of the gentleman is Prof. Sharples.

**MR. BEDFORD.**—The question turns on this one point: That particular clause, which admits professors interested in pharmacy, was intended to admit professors of chemistry, pharmacy, *Materia Medica*, and botany, who are professors in colleges of pharmacy, but are not pharmacists. It was passed at the meeting in New York in 1867, in order that Prof. Chandler, of the College of Pharmacy of the city of New York, should be admitted. It applied, and it was so stated at the time, to no other persons than professors in colleges of pharmacy, and if Prof. Sharples is not a professor in a college of pharmacy, he is not eligible for membership. If he is not eligible the name must be withdrawn, or we cannot vote upon the rest. A black ball thrown against that one candidate would throw out the vote for every one else. The question must be decided: Shall his name be admitted or not?

**MR. EBERLE.**—I move a division of the vote.

**MR. BULLOCK.**—I think it would be well for the gentlemen to give us some little light upon the subject. There may be something connected with it we ought to know.

**MR. BEDFORD.**—Objection being made to the name, the name must be withdrawn.

**THE SECRETARY.**—It certainly should be voted upon separately.

**MR. BEDFORD** —I object to the name of Prof. Sharples, not from any personal objection to him, but that the vote may be taken separately.

**THE SECRETARY.**—The custom has been, when objection was made, privately or otherwise, to withdraw the name, and if the Executive Committee consent to this the vote may be taken upon the rest. The Executive Committee has power to do that.

**MR. ROBERTS.**—It is proper for the Association to divide the vote on the names. I second the gentleman's motion to take a separate vote on all the other names than that of Prof. Sharples.

**THE CHAIRMAN OF THE EXECUTIVE COMMITTEE.**—I wish to say one word before there is a vote taken. If the mover and seconder of the motion will withdraw it, I am willing to withdraw his name from the list. That will save a vote, and I think it will be a quicker way to reach the matter.

**MR. EBERLE.**—I, as mover of the resolution, have no objection to acceding to the request, and I suppose the seconder is willing.

**MR. WELLS.**—It would be parliamentary to set the name aside, and vote upon the others.

**MR. BULLOCK.**—I move, in accordance with our usual custom, unless there is objection made, that the President be requested to cast one ballot.

**THE SECRETARY.**—I object to that. Never in this Association has the election of members taken place by a single ballot. The President has frequently been directed to deposit a ballot for the election of officers, but never for members.

**MR. BULLOCK.**—I think it was done in the meeting at Richmond, where no objection was made by any member of the Association.

**THE SECRETARY.**—I think not.

**MR. LEMBERGER.**—To my recollection Mr. Bullock's idea was never carried out. I know attempts have been made to have that done, but it never was done.

**MR. RICE.**—I believe it is perfectly competent for this Association to order a ballot in any way they choose. I therefore make a motion that the Secretary of the Association be directed to cast one ballot in the affirmative for all the candidates we are now balloting for. This motion has been moved and seconded, and I call for the question.

**MR. COLCORD.**—There has objection been made to that.

**THE PRESIDENT.**—The balloting has already begun, therefore this motion will not be entertained.

The ballot was taken upon the following candidates, who were reported by the tellers to have been duly elected:

**Canada.**

Benjamin Lyman, Montreal.

**Connecticut.**

Stephen Goodrich, Hartford.

Hugh H. Osgood, Norwich.

Thomas Pickford, Wallingford.

N. Douglas Levin, Norwich.

John K. Williams, Hartford.

**Florida.**

John Dabney Palmer, Monticello.

**Georgia.**

Foster L. Chapman, Augusta.

H. P. Tarrant, Augusta.

**Illinois.**

George Henrich, Mascoutah.

**Louisiana.**

Isaac L. Lyons, New Orleans.

J. H. Schaaf, Vidalia.

**Maine.**

Herschell Boynton, Biddeford.

Woodbury Donnell, Richmond.

George A. Parcher, Ellsworth.

James H. Plaisted, Waterville.

**Massachusetts.**

Albert J. Atkinson, Newburyport.

Edwin Baker, Shelbourne Falls.

D. E. Barry, Boston.

George G. Burbank, Worcester.

Thomas R. Clough, Medford.

George Henry Cowdin, Somerville.

John S. Craig, Boston.

S. O. Daniels, Natick.

Charles Sumner Denham, Rockland.

L. W. Easton, Rockland.

Henry D. Ferree, Springfield.

Lewis Cass Flanagan, Somerville.

W. S. Folger, Boston.

Sherman Follansbee, Boston.

Sumner Howard Fuller, Boston.

John Granville Godding, Boston.

Edward Bertelle Gordon, Lynn.

Frank Lucian Harwood, Warren.

Lucian Harwood, Warren.

John Houdin, Boston.

George Melvin Hoyt, Boston.

Thomas L. Jenks, Boston.

William Henry Jones, Boston.

Ernest Clifton Marshall, Charlestown.

Amos Francis Marvel, Taunton.

Walter S. Merrill, Danvers.

John J. Noble, Newton Centre.

James J. O'Brien, Boston.

George B. Plummer, Hinsdale.

H. A. Prescott, Dorchester.

J. Allen Rice, Milford.

James W. Rideout, Boston.

George T. Sears, Boston.

David J. Sewall, Boston.

Israel W. Shurtleff, New Bedford.

Albert C. Smith, Boston.

Jesse Walker Snow, Boston.

Daniel Stowell, Boston.

S. Clarence Tozzer, Lynn.

Charles M. Trask, Boston.

Stephen Webster, Boston.

Frederick W. Wilder, Ware.

Joseph Williams, Worcester.

**Michigan.**

James W. Caldwell, Detroit.

**New Hampshire.**

Thomas E. O. Marvin, Portsmouth.

**New Jersey.**

Robert Cusack, Jersey City.

Samuel E. Dougherty, Jersey City.

Jonathan B. Drake, Elizabeth.

N. J. Finlay, Jersey City.

G. A. Mangold, Trenton.

Godfrey K. Mellor, Jersey City.

William M. Oliver, Elizabeth.

Christian Pauly, Jersey City.

H. P. Reynolds, Plainfield.

Conrad Wienges, Jersey City.

**New York.**

Gustavus Balser, New York.

John W. Bassett, Tompkinsville, S. I.

John G. Bissell, Rome.

Clarence F. Booth, Brooklyn.

Foxwell Curtis Cutts, Jr., Brooklyn.

Henry Douglass, Jr., Brooklyn.  
Edward J. Fischer, Buffalo.  
Hiram E. Griffith, Niagara Falls.  
James W. Hommann, New York.  
William H. Hyler, Port Chester.  
Henry T. Jarrett, New York City.  
Julius Kalish, New York City.  
A. M. Knowlson, Troy.  
Albert H. Sliter, Troy.

*North Carolina.*

James M. Gallagher, Washington.  
Samuel J. Hinsdale, Fayetteville.

*Ohio.*

Walter H. Howson, Chillicothe.  
William E. Jefferson, Fredericktown.

• *Pennsylvania.*

Emil Albrecht, Tamaqua.  
Charles Johnson Biddle, Philadelphia.

William Egbert Krewson, Philadelphia.

*Rhode Island.*

William H. Cotton, Newport.  
George W. Davis, Providence.  
James Henry Taylor, Newport.

*South Carolina.*

W. H. Harbers, Aiken.

*Tennessee.*

William B. Safford, Memphis.

*Vermont.*

C. E. Bingham, St. Johnsbury.  
George D. Randall, St. Johnsbury.

*Virginia.*

Charles H. Lumsden, Lynchburg.  
John B. Purcell, Richmond.

*Wisconsin.*

Herman T. Eberle, Watertown.

The following invitations were received and read by the Secretary:

From the Local Committee of Arrangements inviting the members and their ladies to meet their Boston friends at the parlors of the St. James Hotel at 8 o'clock P.M.; also to call upon W. F. Horton, Secretary of the Local Committee, for tickets to the various entertainments.

From Mr. James F. Babcock, Corresponding Secretary of the Mercantile Library Association, tendering to the members the free use of their reading-room, and,

From Mr. Orlando Tompkins to witness Mr. Chanfrau's performance of "Kit, the Arkansas Traveller," at the Boston Theatre on the evening of the following Thursday.

On motion of Mr. Roberts, the invitations were accepted, and the thanks of the Association returned therefor.

A motion to fix the hours of sitting from 9 to 12, and from 2 to 6 o'clock P.M., was somewhat discussed; but before a vote was reached, Mr. Doliber rose to a point of order, stating that the case of Mr. Sharples was now before the meeting.

THE PRESIDENT.—The name was withdrawn by the Executive Committee.

MR. BULLOCK.—I would ask whether the Executive Committee have the

right to withdraw the name of an applicant after it has been sent in to them signed by two members.

MR. COLCORD.—They can present it again.

THE PRESIDENT.—They have only withdrawn it temporarily.

THE CHAIRMAN OF THE EXECUTIVE COMMITTEE.—That is all.

MR. WIEGAND.—Is there not a question whether he is eligible or not?

MR. BABCOCK.—Is there any reason why a vote could not be taken upon this question, upon its merits, now?

THE PRESIDENT.—I am not well informed yet, as to whether this gentleman is interested particularly in pharmacy as a professor.

MR. BABCOCK.—I am well acquainted with the gentleman, and I understand he is entirely eligible according to the constitution of this Association, which I read, as follows: [Reads Art. I, Chap. 7, as quoted above.] Mr. Sharples is Professor of Chemistry in the Boston Dental College in this city. He was formerly an assistant in the Lawrence Scientific School of Harvard University, and has held other positions as teacher of chemistry in various other universities in this country. He is certainly in the practice of his profession as an analytical chemist called upon to examine and report upon pharmaceutical articles, and unless there is some other reason why he is ineligible and should be rejected, I see no reason why he should not be voted upon, and why he is not eligible.

THE CHAIRMAN OF THE EXECUTIVE COMMITTEE.—The following certificate accompanies the application:

“The undersigned, members in good standing, being personally acquainted with S. P. Sharples, of Boston, testify to his moral character, his skill as a chemist, and his professional probity and good standing, and they recommend him for membership in the American Pharmaceutical Association.

“JOHN H. HUBBARD,  
Cambridge.

“THOMAS HOLLIS,  
Boston.”

THE PRESIDENT.—I can see no reason why he is not eligible to become a member, unless there are other reasons of which I am not aware. In the absence of other information I will order a ballot and appoint the same tellers.

MR. BEDFORD.—I rise to a point of order. The question is, is Prof. Sharples eligible for membership. I do not know him; I speak from no personal motives; I simply state this fact, that this alteration of the constitution was for the admission of professors in colleges of pharmacy. It was so stated at the time.

THE PRESIDENT.—The clause does not say so.

THE SECRETARY (in answer to an inquiry whether a single black ball would reject).—No, sir; it requires two-thirds of the votes cast to elect.

After counting the votes the tellers reported through the

President, that 74 ballots had been cast for, and 26 against the admission of the candidate, Mr. S. P. Sharples, of Boston, who, having received more than the requisite two-thirds of the ballots, was declared to have been duly elected.

Mr. Bedford gave notice that he would move for an amendment of the by-laws, restricting the eligibility of professors of chemistry and materia medica to professors in colleges of pharmacy. The proposition lies over under the rules.

The reports of the following committees were read by title, and laid upon the table for future action:

Report of the Executive Committee, and of the Permanent Secretary.

"	Committee on Papers and Queries.
"	" Unofficial Formulas.
"	" Adulterations and Sophistications.
"	" Legislation.
"	" Ebert Prize.
"	" Maximum Doses.
"	" Formulas for Elixirs.
"	" Publication of Papers in Advance of Proceedings.
"	" Liebig Memorial.

The President announced the appointment of the following committees:

Committee on the President's Address: Paul Balluff, of New York; N. Hynson Jennings, of Maryland; and Joseph L. Lemberger, of Pennsylvania.

Committee on Specimens: Joseph Roberts, Maryland; E. H. Doolittle, Massachusetts; A. S. Lee, North Carolina; P. E. Dupuy, Virginia; and George Leis, Kansas.

The appointment of the Nominating Committee was next proceeded with, the various associations represented by delegates making the following appointments:

Philadelphia College of Pharmacy, . . .	Thomas S. Wiegand.
New York College of Pharmacy, . . .	Frederick Hoffmann.
Cincinnati College of Pharmacy, . . .	J. D. Wells.
Massachusetts College of Pharmacy, . . .	S. M. Colcord.
Maryland College of Pharmacy, . . .	William S. Thompson.
Louisville College of Pharmacy, . . .	E. Scheffer.
National College of Pharmacy, . . .	Charles Becker.
Tennessee College of Pharmacy, . . .	Benjamin Lillard.
Ontario College of Pharmacy, . . .	E. Gregory.



Literary and Scientific Society of German Apothecaries of New York, . . . . .	P. F. Lehlbach.
Newark Pharmaceutical Association, . . . . .	Charles H. Dalrymple.
Camden County, N. J., Pharmaceutical Association, . . . . .	A. P. Brown.
New Jersey Pharmaceutical Association, . . . . .	R. W. Gardner.
New Hampshire Pharmaceutical Association, . . . . .	Charles A. Tufts.
Rhode Island Pharmaceutical Association, . . . . .	A. L. Calder.
Vermont Pharmaceutical Association, . . . . .	M. K. Paine.
Richmond Pharmaceutical Association, . . . . .	T. R. Baker.
Tennessee Pharmaceutical Association, . . . . .	James Thomas, Jr.
Alumni Association, Maryland College of Pharmacy, . . . . .	E. W. Russell.
Alumni Association, Cincinnati College of Pharmacy, . . . . .	A. W. Bain.
Alumni Association, New York College of Pharmacy, . . . . .	Thomas F. Main.
Alumni Association, Massachusetts College of Pharmacy, . . . . .	James F. Babcock.
Alumni Association, Philadelphia College of Pharmacy, . . . . .	R. V. Mattison.
New York Alumni Association, Philadelphia College of Pharmacy, . . . . .	H. S. Wellcome.

In addition to the foregoing, the President appointed the following gentlemen from the Association at large: F. H. Masi, of Virginia; J. L. Lemberger, of Pennsylvania; G. J. Luhn, of South Carolina; G. W. Berrian and Joel S. Orne, of Massachusetts.

On motion, the Association adjourned to Wednesday morning at nine o'clock.

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*Second Session.—Wednesday Morning, September 8th.*

Owing to the delay of the Nominating Committee in finishing their report the Association was not called to order until 10 o'clock. President Diehl in the chair.

The minutes of the first session were read by the Secretary, amended, and then approved.

Mr. Wiegand, in behalf of the Nominating Committee reported the following names for officers for the ensuing

*For President.*

GEORGE F. H. MARKOE, . . . . . Boston

*For First Vice-President.*

FRED. HOFFMANN, . . . . . New York.

*For Second Vice-President.*

T. ROBERTS BAKER, . . . . . Richmond, Va.

*For Third Vice-President.*

C. F. G. MEYER, . . . . . St. Louis.

*Treasurer.*

CHARLES A. TUFTS, . . . . . Dover, N. H.

*Permanent Secretary.*

JOHN M. MAISCH, . . . . . Philadelphia, Pa.

*Reporter on Progress of Pharmacy.*

C. LEWIS DIEHL, . . . . . Louisville, Ky.

*Executive Committee.*

GEORGE W. KENNEDY, . . . . . Pottsville, Pa.

JOSEPH L. LEMBERGER, . . . . . Lebanon, Pa.

WILLIAM MCINTYRE, . . . . . Philadelphia, Pa.

CHARLES A. HEINITSH, . . . . . Lancaster, Pa.

JOHN M. MAISCH, Permanent Secretary, *ex-officio*, . . . Philadelphia, Pa.*Committee on Papers and Queries.*

WILLIAM SAUNDERS, . . . . . Ontario, Can.

EMIL SCHEFFER, . . . . . Louisville, Ky.

JAMES H. TAYLOR, . . . . . Newport, R. I.

*Business Committee.*

JACOB D. WELLS, . . . . . Cincinnati, O.

PAUL BALLUFF, . . . . . New York.

WILLIAM O. BAKES, . . . . . Philadelphia, Pa.

The Nominating Committee likewise suggested that nominations for the Committee on the Drug Market be laid over for the present to await the report of the Committee on the President's Address, in which the discontinuance of that committee had been proposed.

The Chair ordered a ballot to be taken for the nominee for President, and appointed Messrs. Lehlbach, of New York, and Sharples, of Boston, tellers, who reported the whole number of votes to be ninety-one, of which number eighty-six had been in favor of Mr. Markoe, who was thereby duly elected

President of the American Pharmaceutical Association for the ensuing year.

On motion of Mr. Balluff, the President was directed to cast an affirmative ballot for the remaining officers and standing committees, which being done the election of the gentlemen was announced by the President.

The President appointed Messrs. W. J. M. Gordon, of Cincinnati, and S. M. Colcord, of Boston, a committee to conduct the President-elect to the chair, and the latter not being present, the First Vice-President-elect, Mr. Fred. Hoffmann, was invited to preside, and after having been introduced by the retiring President, took the chair, thanking the Association for the honor conferred, and wishing a successful continuance and pleasant close of the present meeting.

The Committee on Credentials reported having received credentials from the Pharmaceutical Association of the Province of Quebec, accrediting Mr. Stephen Jones Lyman as their delegate to this meeting. On motion the gentleman was admitted as a delegate.

Mr. Kennedy read the report of the Executive Committee as follows:

**TO THE OFFICERS AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:**

The Executive Committee, in accordance with requirements of the by-laws, would respectfully present at this meeting their report. The twenty-second volume of the Proceedings of your Association was issued in the latter part of the month of January, being about ten weeks earlier than last year. Had it not been for delays, beyond the control of your committee, the Proceedings would have been in possession of the members before the commencement of the present year.

The causes which frequently prevent an early publication of the Proceedings can, to a very great extent, be obviated, if committees who have reports to make would have them ready, and hand them to the Executive Committee at the meeting. Some of the reports for publication last year were not received, so as to make preparations for the printer, for many weeks after the adjournment; and one of the reports did not reach your committee till the 18th of December.

The attention and labor given by our efficient Permanent Secretary to an early issue of the Proceedings is commendable.

By instructions from the Association at our last meeting, your committee attended to the duty of having the picture of our late Prof. Procter published with the Proceedings. The portrait is a good one, representing our deceased

co-laborer in the prime of life, and at a time when most of his important researches were made. The picture was printed from the steel plate engraved for the Publishing Committee of the American Journal of Pharmacy. One thousand two hundred and fifty were ordered, at a cost of \$36 per thousand, making the total cost for one thousand two hundred and fifty \$45, that being about one-quarter the cost of the plate alone.

On similar favorable terms the portrait of the late Prof. Parrish may be obtained, and the committee have already taken steps to embellish with it the next volume of the Proceedings. On assuming the duties of Chairman of the Executive Committee, on inquiry as to the whereabouts of the roll-book, I was surprised when informed that there never had been one kept, and, as it belongs to the Executive Committee to have revision of the roll, I immediately had a book made, and have since completed a roll, which involved much labor. I find since the organization of the Association up to last meeting, we have had a total active membership of 1697, and have lost, during the same period, by death 186, dropped from roll 477, resigned 101, making a total of 714, leaving a balance of 988 members; besides the above, we have had a total honorary membership of 80, and have lost by death up to last meeting 8, and since then 2, leaving but 20 honorary members. Your chairman would report that, in making up the roll, he discovered quite a number of errors in names of members, as in the case of West, it being written Nest. The greatest care should be used, as far as possible, as to the spelling of names and legibility. I experienced a great deal of trouble in making up the roll in this respect. I shall esteem it a kindness if any member, who notices an error of this kind, would notify either the Treasurer, Permanent Secretary, or the Chairman of the Executive Committee, so that the correction be made at once.

The applications for membership, with their respective vouchers attached thereto, which have thus far been received, have been regularly filed, and will be reported for election at the proper time. At our last meeting there was quite a number of applications received, which were not signed by the applicants, and, after the meeting, were returned to them for their signatures. Your chairman would here suggest the importance of all members when supplying their friends and acquaintances with blank applications, informing them that it is absolutely necessary that their applications should be accompanied with the initiation fee and the annual contribution for the current year; and if they desire to have a certificate of membership, to send an additional \$5; should they prefer having the certificate on parchment, instead of \$5 will be \$7.50. Also the importance of signing their application, and, if convenient, to be present at the meeting when elected, so that they can sign the constitution and become members of the Association, when their names shall appear on the roll as such. In accordance with by-laws, Chapter vii, Article iii, no person shall be a member of this Association, nor shall his name be placed upon the roll until he shall have signed the constitution. I hope this suggestion will not be passed by unobserved, as my predecessors have called the attention of the Association many times to this matter, and with apparently little effect.

Before closing my report, the sad duty remains to be performed of announ-

ing the names of those who have passed away from this world, and it is hoped have gone to a better.

Death has been very busy in our midst during the past year, as it had been in the preceding year. Amongst those who have been removed from our midst, two of them occupied the chair of the highest office of this Association; also two were honorary members.

So far as I have been able to ascertain, the following is a list of deceased members during the year:

HUGO HENSCH, . . . . .	Cleveland, Ohio.
A. P. MELZAR, . . . . .	Wakefield, Mass.
WILLIAM B. CHAPMAN, . . . . .	Cincinnati, Ohio.
ISAAC CODDINGTON, . . . . .	New York City.
JOSEPH MOTT, . . . . .	Columbus, Ohio.
JOHN MILHAU, . . . . .	New York City.
WILLIAM BROWN, . . . . .	Boston, Mass.
THOMAS HOLLIS, . . . . .	Boston, Mass.
ANDREW J. TULLY, . . . . .	New York City.
JOSEPH W. NAIRN, . . . . .	Washington, D. C.
THOMAS A. LANCASTER, . . . . .	Philadelphia, Pa.
MONTGOMERY J. BAILEY, . . . . .	New York City.
DANIEL HANBURY, . . . . .	London, England.

HUGO HENSCH died at Cleveland, Ohio, February 22d, 1874. Mr. Hensch was born at Wittlich, Rhenish Prussia, 1815, and educated at the university at Treves. He paid especial attention to chemistry and the natural sciences. He afterwards established himself in the drug business in his native place, and remained until the breaking out of the revolution in 1848. He being an ardent politician of the most ultra-liberal views, took at once a prominent part, and remained in the field until the downfall of the popular movement, when he took refuge in France. After living some time in Paris, being banished from his country, he came to the United States in the year 1850, and engaged for a few years in the drug business in New York City, whence he went to Cleveland, Ohio, and where he remained in the drug business until he died. He was elected a member of this Association in 1872.

A. P. MELZAR died at Boston, Mass., September 27th, 1874, of apoplexy, in the fifty-fifth year of his age. Born at Marblehead, August 12th, 1820. Was apprenticed to the apothecary business at the age of twelve years. Was in business for himself about thirty-two years, and did business at the corner of Shawmut Avenue and Canton Street for nineteen years. Mr. Melzar was a member of the Massachusetts College of Pharmacy, and a member of the Board of Trustees, and Secretary of that body for seven consecutive years. As a pharmacist, he was able and energetic. He is spoken of as being a respected citizen, an honest and conscientious upright man. Was elected a member of this Association in 1856.

WILLIAM B. CHAPMAN died at Cincinnati, Ohio, October 10th, 1874, of dysentery, after a brief illness. The deceased was born at Pennypack Hall, near Philadelphia, June 5th, 1818. Graduated at the Philadelphia College

of Pharmacy, March, 1834, and moved to Cincinnati, April, 1835. He was associated with Dr. Eberly in the drug business until 1839, when they dissolved. The subject of this sketch then started business on his own account at the corner of Sixth and Walnut Streets, and subsequently at the corner of Court and Vine Streets. When the Mechanics' Institute was completed, he opened a store in that building, which was long identified with his name. In the spring of 1839 he obtained the diploma of M.D. from the Ohio Medical College. He was one of the oldest members of this Association, having being elected a member in 1852. Was elected President of this Association at our third annual meeting, held in Cincinnati in 1854. During our late war he was appointed Surgeon of the United States Army, being stationed at Camp Dennison. At the time of his death he was the oldest pharmacist in Cincinnati, and held a high rank in the profession. In 1872 he was elected Professor of Pharmacy in the Cincinnati College of Pharmacy, and more recently was appointed by the Court of Common Pleas one of the Pharmaceutical Board of Examiners.

ISAAC CODDINGTON, a prominent pharmacist of the city of New York, died October 14th, 1874. He was elected to membership in this Association in 1855. Was a member of the firm of I. & J. Coddington, whose store was situated for quite a number of years on Broadway, corner of Washington Place, and more recently opposite Union Square. Whilst a member of this Association, he always took great interest in its objects, and, when present at the meetings, occasionally participated in the discussions. The deceased was a member of the New York College of Pharmacy, for which he labored without intermission for the promotion of its interest. He was also specially noted for his strict and close attention to business.

JOSEPH MOTT died at Columbus, Ohio, December 19th, 1874, of congestion of the brain. In 1859, Mr. Mott commenced an apprenticeship to the drug business with Mr. Augustus Schuller. After serving the regular required time as an apprentice, he still remained with Mr. Schuller, and continued in his employ altogether nine years. In the fall of 1868, he began business for himself, and so remained up to the time of his death. He is represented by those best acquainted with him, to have been a good apothecary and possessed of a kind disposition and courteous bearing, was successful in business, and had a very large circle of friends. His connection with this Association dates from 1872.

JOHN MILHAU died in the city of New York, December 28d, 1874, in the eightieth year of his age. Was born in Baltimore, Md., in the year 1795. He received his education at Emmettsburg Seminary, and at a very early age commenced business, but was unfortunate in losing all his stock and fixtures by fire shortly afterwards, upon which there was no insurance. It was not long before he was re-established in business, and by his fearless energy and steady application to business, with economy combined, he was soon enabled to repay the advances made to him by friends, and in 1828 to retire from business with what was then considered a competency. For the third time he visited Europe, in 1829, to prosecute his studies in pharmacy and chemistry under eminent instructors at Paris. After his return to this country he made an

extended tour through the Southern and Western States, and finally settled in New York City, where, in the fall of 1830, he opened a drug store corner of Maiden Lane and Broadway. In the following year he moved opposite to No. 183 Broadway, which property he afterwards purchased, and where the business established by him is still carried on by his sons. In 1869 he retired from active business life, having lost the use of his right arm by a fall, and lived in retirement to within a few weeks of his golden wedding, which would have occurred on the 10th of February, 1875. On settling in New York he soon identified himself with the recently established College of Pharmacy, and was one of the charter members in 1831, and for many years as an officer, first as Vice-President and afterwards its President, he always used his influence to advance the interest of the institution. Mr. Milhau connected himself with this Association in 1855, served as its first Vice-President for the term 1862 and '63, and as President in 1867 and '68, in which latter capacity he presented at the meeting of 1868 an address which is full of sound observations and good advice. Mr. Milhau was highly esteemed as a citizen; kind and genial in disposition, his bearing was always courteous and dignified; prompt, reliable, and judicious in his business relations, he possessed the qualities insuring success. He leaves a wife and four sons to mourn their loss.

**WILLIAM BROWN** died at Boston, Mass., February 10th, 1875, in his seventieth year. Deceased was born at Little Compton, Rhode Island, and with three brothers, all apothecaries, located in Boston, where by industry and close attention to business, he accumulated a large fortune. He had an excellent reputation, and was highly respected. His election as a member of this Association dates from 1858.

**THOMAS HOLLIS** died at Boston, Mass., May 17th, 1875, aged seventy-three years. He was born in that city in 1802. Very early in life he was apprenticed to Dr. Bartlett, of Charlestown. At the age of eighteen years he clerked for Nathan R. Heald in Market Square. At the age of twenty he commenced business on his own account, and afterwards became associated with T. Brigham, in Avon Street. In 1823 he formed a partnership with Daniel Gregg, in Union Street, and occupied the same store up to the time of his demise. In 1831, Mr. Gregg having retired from business, left Mr. Hollis all alone, since which time he was without a partner. The deceased took great interest in the Massachusetts College of Pharmacy, of which he was a member. He was elected a Trustee of the College in 1854, Corresponding Secretary in 1855, Vice-President in 1856, and President in 1857, resigning the latter office in 1871, having served in that capacity fourteen years. He became a member of this Association in 1855, and was elected one of its Vice-Presidents for the years 1864 and '65. The deceased was a man respected, honored, and beloved by all who knew him, as a Christian gentleman. His belief and faith were shown forth in acts. Honest and upright in thought, word, and deed, he has long been an example of energy and usefulness, not only in all matters of business, but also in very many public positions of trust and charities. He acted for twenty years as director of the House of Industry, and a portion of the time as chairman. Was elected to the Common Council of Boston, served on the School Committee, and for the past twenty years was President of the



Howard Benevolent Society. He leaves four children, three sons and one daughter.

ANDREW J. TULLY, formerly of Cincinnati, Ohio, late of New York, died at Dayton, Ohio, April 22d, 1875, of consumption, in the thirty-fourth year of his age. Mr. Tully was born at Galway, Ireland, in 1841; came to this country when quite young; served an apprenticeship to the drug business with Mr. Siddell, of Madison, Ind. After being in Mr. Siddell's employ six years, commenced business for himself, corner Seventh and Mound Streets, Cincinnati, afterwards at Fort Wayne, Ind., and subsequently at the corner of Fourth and Walnut Streets, Cincinnati. When his health failed him, at the time of his death, and eight months previous, he was in the employ of Messrs. McKesson & Robbins, of New York, as travelling salesman. Accepting this position with the hope of regaining his health, and up to within a few weeks of his death, when the last agreement was made between him and his employers, when advised by them to retire from travelling on account of his ill-health, he seemed very anxious to continue travelling, being exceedingly sanguine about himself, saying that it agreed with him, and he hoped soon to find his health improved. By his kind and generous disposition and unbending integrity, and earnest application to business, he won the respect of all who knew him, and is spoken very highly of by his late employers. He leaves a wife and two children. Was elected a member of this Association in 1862.

JOSEPH W. NAIRN died at Washington, D. C., May 27th, 1875, aged fifty-two years. Mr. Nairn was born in Washington, D. C., in the year 1828. At the age of sixteen he engaged in the acquirement of a knowledge of the drug and apothecary business in one of the oldest and best conducted stores in the country, where he spent the remainder of his life, a period of thirty-six years, passing through the various grades of apprentice, assistant, partner, and sole proprietor, practicing and maintaining at all times his profession with zeal, industry, and dignity, and by his admitted skill and knowledge, united to his well-trained business habits, and the manners of a Christian gentleman, he secured the confidence and esteem of the entire community, and the rewards of a substantial and successful business. In early life he realized the importance and necessity of a combined effort on the part of the pharmacists of the District of Columbia to secure a frequent interchange of views, experiences, and results in everything pertaining to the pharmaceutical profession, and with a number of others organized the first Pharmaceutical Association of the District of Columbia, and continued a useful member thereof, performing his duties as an officer and member with credit to himself and honor to the Association. Mr. Nairn was one of the number who organized the college in Washington in 1872. Being one of the most liberal contributors towards the enterprise, he was elected a member of its first Board of Trustees, and displayed a most commendable devotion to its interests. In the year 1858 he was elected a member of this Association.

THOMAS A. LANCASTER was born in Frankford, Pa., and after having received a liberal education was apprenticed to William Hodgson, Jr., Philadelphia, from whose store he graduated at the Philadelphia College of Pharm-



acy in the spring of 1859, his thesis being an investigation of the acids existing in the juices of rhubarb stalks, tomatoes, and quinces. He continued with Mr. Hodgson, who afterwards admitted him as partner, and finally transferred to him his entire interest in the well-known business, located at the corner of Tenth and Arch Streets, in Philadelphia, where he continued until the time of his death, which took place August 28th, 1875. The deceased, who joined this Association in 1859, sustained a good reputation as a careful pharmacist, and contributed to the pharmaceutical literature a few papers, which have been published in the American Journal of Pharmacy.

MONTGOMERY J. BAILEY, an honorary member of this Association, was elected to membership in 1856. He was the first inspector of drugs and chemicals at the most important port, New York, under the drug inspection law of 1848, and contributed some papers, which have been published in the Proceedings of 1852, 1853, and 1857. His communications will be found quite interesting. During his administration as inspector there was rejected over nine hundred thousand pounds of unsafe, adulterated, and improper drugs and medicines, and during eleven months of his official career he reports as having rejected of the more important drugs the following: Senna, 11,820 pounds; sugar of lead, 11,017 pounds; lac sulphur, 8620 pounds; carbonate of magnesia, 3900; sarsaparilla root, 4370. This is but a few of the number he reports, besides a large number of articles in small quantities rejected by him, and not considered of sufficient importance, were not noted. As an inspector, Mr. Bailey did good service, and was removed from office on political grounds.

DANIEL HANBURY, an honorary member of this Association, departed this life March 24th, 1875, in the fiftieth year of his age. In the year 1841 he commenced his studies under the firm of Allen, Hanbury & Barry, of which his father was an active member. Here his peculiar abilities were speedily manifested and appreciated. In the year 1844 he studied at the laboratory of the Pharmaceutical Society. His pursuits early brought him in contact with the late Dr. Pereira, who treated him with great consideration, and a warm friendship sprang up between the Professor and his pupil, which lasted till the death of the former. By referring to the index of the American Journal of Pharmacy you will find sixty-one of his articles scattered through its volumes, the last being incorporated in an article entitled "Cinchona or Chinchona." The series of papers on Chinese Materia Medica, published in the years 1860, 1861, and 1862, were highly esteemed by those most capable of appreciating them, and afford a characteristic example of accurate and careful research. Most happily the work upon which he had been engaged for many years, in conjunction with Prof. Flückiger, the "Pharmacographia," was completed and published last year. Whilst alluding to his writings, we must not omit to mention the important part he took in the preparation of the "Pharmacopœia" of India, a work involving much labor. Botany was the science to which he devoted much of his attention. He contributed to the Transactions of the Linnæan Society the following papers: Note on *Cassia moschata*, on the species of *Garcinia* which affords gamboge in Siam, and with Mr. Curry, remarks on *Sclerotium stipitatum*, and similar productions by him will be

found in the Journal of the Linnæan Society. He served on the Juries of the International Exhibition in 1862 and 1867, and in the former year acted as Secretary to the Jury on Vegetable Products, the proceedings of which were conducted in French. In the year 1855 he was elected a fellow of the Linnæan Society, repeatedly served on its council, and held the office of treasurer at the time of his death. He was also a fellow of the Chemical Society, and member of its council in the year 1869. In the year 1867, on his first nomination, he was elected a fellow of the Royal Society, and a member of its council in 1878. In 1870 he retired from business. He never married, but lived with his parents, to whom he was a most kind and affectionate son. Though possessed of ample means, his habits, we believe, both from principle and taste, were remarkably simple and inexpensive. He disliked and shunned everything approaching ostentation, and luxury and self-indulgence were utterly alien to his life. He was an early riser, and got through with a large amount of work before breakfast, and few indeed were the moments wasted from early morning until he again retired at night. Mr. Hanbury remained to the last a member of the Society of Friends, amongst whom he had been brought up. With characteristic reticence, he scarcely ever alluded to his own religious experience, but his habits of devotion and an occasional expression afford evidence of the reality of his Christian faith. He became an honorary member of this Association in 1868.

The above comprises all the particulars that your committee were able to obtain. I would especially invite the attention of members to the following: In case they should hear of the demise of any of their fellow-members in their respective places of residence, to report the same to the Chairman of the Executive Committee, and if possible to furnish him with the particulars of the same. I can assure you it will be regarded as a great kindness, as it is impossible to make up a good report without receiving assistance from members in this respect. In conclusion, the Chairman wishes most sincerely to tender his thanks to the Permanent Secretary, and to other officers and members of the Association who rendered such valuable assistance whenever called upon.

Yours, etc.,

GEORGE W. KENNEDY,  
Chairman of the Executive Committee.

The report was accepted and referred.

The President-elect having arrived was conducted to his official station by the committee previously appointed, and introduced to the Association, the members rising from their seats, when he took the chair, speaking as follows:

GENTLEMEN OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

To say that I thank you would be but to feebly express my deep feeling of appreciation of the honor which you have conferred upon me. It would be quite impossible for me to make any extended expression of my feeling. I

have only to say that this honor is unexpected; that I bring to the office nothing but inexperience, but I pledge to you, gentlemen, that the position shall have the best effort that my time and my strength will allow. Thanking you again most earnestly, I will proceed with the business of the Association.

The Permanent Secretary now read the annual report, as follows:

#### REPORT OF THE PERMANENT SECRETARY.

##### TO THE CHAIRMAN OF THE EXECUTIVE COMMITTEE:

In the prefatory notice to the last volume of the Proceedings attention was drawn to some of the causes which delayed the appearance of the volume beyond the time expected; one of the causes, however, was not mentioned there, the Secretary preferring to let the record of the final agreement go before the members of the Association without any comments on his part, reserving for this report a brief statement of the novel and peculiar circumstances by which the final issue of the Proceedings had to be postponed for some weeks.

An abstract of the paper read by Mr. A. E. Ebert, in answer to the query, "What is Cinchoquinine?" had been published in the Druggists' Circular, and, it seems, had attracted the attention of the manufacturers. The proof-sheet of the Proceedings (signature 29) was received from the printer December 8d, and a short time afterwards the Secretary had a visit from Prof. S. P. Sharples, of Boston, State Assayer of Massachusetts, in relation to Mr. Ebert's paper. His request to read the paper was at once complied with, but a copy of it was not furnished, in accordance with the general instruction by the Association. About the middle of the same month the Secretary was visited by Mr. C. S. Davis, of the firm of Billings, Clapp & Co., the manufacturers of cinchoquinine, with a letter of introduction from a member of the Association, and the request to make a qualitative analysis of their article, which was declined for want of time, but Mr. Davis was referred to Prof. F. A. Genth, of the University of Pennsylvania. A note from the Philadelphia counsel of Messrs. Billings, Clapp & Co. induced the Secretary to call upon that gentleman December 30th last, when it was learned that the manufacturers of cinchoquinine intended to take out an injunction to prevent the publication of the Proceedings with Mr. Ebert's paper, upon the asserted ground of its libellous character. Such a character was denied by me, and finding that I would not suppress the paper in question, the counsel suggested that a reply to it by Messrs. Billings, Clapp & Co. be published in the same volume. To this I objected, taking the ground that my instructions were that the "Proceedings" contain the minutes, discussions, and all reports and papers actually read and authorized by this Association; however, as editor of the "Proceedings," I had always considered it my duty to notice *editorially* any supposed errors or accidental misstatements, and having referred Mr. Davis to Prof. Genth, who was personally known to me, I would publish his analytical results if obtained with cinchoquinine about a year old.

The possibility of litigation induced the Secretary to address a circular letter to the Executive Committee, asking, 1, for power to engage counsel, and obtain decision of the proper court, and, pending these proceedings, 2, to cancel the paper in question, and issue the volume without it, containing in its stead four blank pages, the essay to be sent out as soon as a favorable decision should be obtained. These propositions were unanimously approved by the Executive Committee and President.

Meanwhile, after some correspondence with the manufacturers of cinchoquinine, a paper was submitted to the Secretary which he considered his editorial duty to publish, upon pages 645 and 646 of the last Proceedings, as correcting a statement made by Mr. Ebert averring the total absence of quinia from the preparation in question as far as it might be applied to all samples. It was also thought that at least three of the four certificates, and more particularly that by Prof. Genth, were so carefully worded as to leave no doubt whatever in the mind of any unbiassed reader, that, while quantitative analyses were not made, yet the quantity of quinia could only be minute. These qualitative examinations have since been supplemented by quantitative assays, which will most likely be found in the report on the Progress of Pharmacy for the present year, and from which it will appear that cinchoquinine is an arbitrary mixture of variable composition, which has no claim for that reliance which it apparently still receives from some physicians and a portion of the medical press.

The arrangement of the matter in last year's volume of Proceedings differs essentially from that of previous years. Those who are familiar with the annual publication of the British Pharmaceutical Conference will have noticed that the arrangement of the latter has suggested the alteration in the former. As far as the Secretary has learned, the innovation has been favorably received by the members, and an earlier publication of the work may be looked for if the Association will hereafter not receive any unfinished reports and papers.

The printed official report of the Fourth International Pharmaceutical Congress was received just in time to incorporate its decisions in the Proceedings, and thus bring them to the earlier notice of our members. The invitation of the American Pharmaceutical Association to call the Fifth International Pharmaceutical Congress at the city of Philadelphia during the Exposition to be held there in 1876, was laid before the congress at St. Petersburg, but no decision was arrived at, the following resolutions bearing on this question being passed:

"The Fifth International Congress shall convene in the course of five years, or at farthest near the close of 1879.

"Members of the international congress committee are the directors of the largest pharmaceutical societies of the several states."

The selection of the time and place of the next congress rests with the committee appointed under the last-named resolution; but the congress expressed by resolution a preference for London, Great Britain, and the several speakers declared themselves in favor of an interval of about five years before the meeting of the next congress.

The disposition made by the last pharmaceutical congress with the query relating to an international Pharmacopœia, has been brought to the notice of the Association by the publication, upon pages 474 and 475 of the last Proceedings, of the resolutions adopted by the congress. It remains to be added that after the final adjournment of the congress the delegates met for the purpose of dividing among themselves the draft of an international Pharmacopœia prepared by the Paris Pharmaceutical Society, and to agree upon some principles which should guide the reviewing and completion of the draft. It was decided that evaporation in vacuo should not be directed for the preparation of the extracts; that the fluid extracts of the United States Pharmacopœia should be critically examined; and that the temperature for taking the specific gravity of all liquids should be uniformly 15° C. (59° F.). The critical review of the submitted draft, it was expected, should be completed by December 1st (18th) of last year, after which it was to be multiplied and communicated to the interested pharmaceutical societies for their examination and report. At the last meeting, in Louisville, our Association decided to participate in this undertaking.

No further official information having reached the Secretary, the following letter was addressed to the president of the congress of St. Petersburg:

MR. A. VON WALDHEIM,

President of the Fourth International Pharmaceutical Congress.

DEAR SIR: The American Pharmaceutical Association will hold its Twenty-third Annual Meeting in the city of Boston early in September next, and will then determine upon the proper measures for its Twenty-fourth Annual Meeting, which will convene in Philadelphia during the International Exposition in 1876. You are aware that the Fourth International Pharmaceutical Congress was invited to call the meeting of the fifth congress to assemble in Philadelphia in 1876. The selection of the proper place and time having been referred to the international congress committee, I take the liberty of inquiring of you whether that committee has decided upon the invitation above referred to.

I also take the liberty of asking for information in relation to the proposed draft of an international Pharmacopœia; if possible, the American Pharmaceutical Association desires to participate in its elaboration.

Be pleased, sir, to accept the assurance of the high consideration with which I have the honor to remain

Yours, very respectfully,

JOHN M. MAISCH,

Permanent Secretary, American Pharmaceutical Association.

PHILADELPHIA, June 3d, 1875.

No reply has as yet been received to this communication. It will be observed, however, that there is scarcely any probability that the Fifth International Pharmaceutical Congress will meet as early as 1876, and that whatever arrangements are made by the meeting of the Association in Boston, the meeting of the congress need not be taken into consideration. By a resolu-

tion passed at the St. Louis meeting (see Proceedings, 1871, p. 71), a cordial invitation has been extended to the pharmacists of all nations to meet with this Association in 1876, and this invitation was officially brought to the notice of the St. Petersburg congress (see Proceedings, 1874, p. 472). It would remain now for our Association to communicate directly with the various national and local pharmaceutical societies of foreign countries, and invite their members to meet this Association during the Centennial Anniversary of our Republic.

The Secretary desires to direct attention to the report of the Committee on Arrangements for 1876, which was presented at the Richmond meeting (see Proceedings, 1873, p. 65), and laid over for future action. Some of the suggestions mentioned there will be carried out by the Philadelphia College of Pharmacy, which has already invited the members of all foreign pharmaceutical societies to make the college building their headquarters during their visit to the International Industrial Exposition or to the meeting of our Association. The college proposes to engage an actuary, who shall be daily in attendance, for the purpose of giving all needful and desirable information to strangers; to keep a register of all visitors; to keep a list of good boarding-houses; to make arrangements with livery stables for carriages at fixed prices; to arrange a room for reading and correspondence; to procure the leading newspapers of this country and Europe; to issue a reliable guide-book of Philadelphia; to obtain cards of invitation to the various public and private institutions, etc. In this invitation the members of the pharmaceutical societies of this continent are likewise included. The Secretary would suggest that a committee of arrangements, which should include the Local Secretary for the ensuing year, be appointed, to which the committee report rendered in 1873 might be referred, with power to act.

It would, perhaps, be premature at the present time to decide upon the number of days which the Twenty-third Annual Meeting is to occupy. So many matters will influence the duration of the meeting, more particularly the visits to the Exposition, that plans for holding the sessions would probably best be submitted by that committee at the beginning of the next Annual Meeting. But inasmuch as the chief interest outside of the sessions of the Association next year would most likely concentrate in the Centennial Exposition, where pharmaceutical and allied products from all parts of the world may reasonably be expected, it would probably be advisable not to have a special exhibition in connection with the Twenty-fourth Meeting, except so far as specimens for the illustration of reports and papers are concerned.

To insure the comfort of visiting pharmacists from abroad, it would be desirable if the various pharmaceutical societies in the United States and Canada would appoint suitable committees for the purpose of giving information to strangers who may desire to visit their cities. A recommendation from the American Pharmaceutical Association would, perhaps, hasten such or similar measures. It is suggested that these local committees enter into correspondence with each other, and more particularly with the Committee of Arrangements of this Association, or the Centennial Committee of the Philadelphia College of Pharmacy, whereby harmony of action would be



secured, and the arrival of visiting pharmacists could be announced to the local committees in advance. It may be expected that a number of pharmacists visiting this continent during the coming year are not familiar with our language; to such in particular it would be a great relief and satisfaction to know beforehand that, when landing on our shores, they will be received by friends, and welcomed as heartily as those who speak the English tongue. While many may take the ocean steamers for Philadelphia direct, the other Atlantic ports having steam communication with foreign countries, as well as San Francisco, may be the landing-places of many, and the local committees in these cities should take measures to take care of them at their arrival.

An invitation was received and accepted by the Secretary to read a paper on American pharmacy, and its relations to public health, before the American Public Health Association, which met in Philadelphia in the month of November, 1874. In this paper the Secretary dwelt upon the importance of pharmacy to the welfare of the public, referred to the large amount of spurious and adulterated drugs and preparations formerly imported to and often specially manufactured for North America; to the salutary effects of the drug inspection law of 1848; to home adulterations, its causes and the channels through which such goods are sold; to the so-called specialties, and the manner in which they are introduced; to patent medicines, and measures to limit or decrease their sale; to the pharmacy laws, and the benefits derived from their enforcement; and to the laws for the suppression of the trade in abortifacient drugs and preparations. In conclusion, it was stated that the most effectual mode to secure all advantages of American pharmacy to public health was to insure the proper qualification of pharmacists, which, among kindred objects, is one of the main purposes of the national and nearly all local pharmaceutical associations.

Up to December last year twenty-one members had tendered their resignation, and a large number had to be placed upon the suspended list, either for non-payment of dues, or because they could not be reached by the Treasurer and Secretary, in consequence of removal without having notified the proper officers; a number of them have, however, again perfected their membership. The neglect to pay the annual dues causes yearly much trouble to the Treasurer and Secretary. The latter officer is by the by-laws directed to withhold the Proceedings from all who are in arrears for the current year. Occasionally, through an oversight in the list of arrearages, or in consequence of sending the Proceedings for distribution to the authorized agent, or an old member of the Association in a particular city, members who were in arrears have often received the Proceedings when they were not entitled to them; or when in arrears for several years some would send the dues for one year to the Treasurer, and inform the Secretary that they had paid, when the volume would be sent. The possession of the Proceedings has been repeatedly held by some members as evidence that their dues for the corresponding year had been paid, when in fact they had received the publication to which they were not then entitled. During the past year the Secretary has had more than the usual correspondence on this account, and takes occasion to allude in this place to these circumstances, also for the purpose of showing that he does not

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deserve any blame from those members who, while having paid regularly for a number of years, may not receive the Proceedings, from their neglect of paying the *current* year's dues.

The stock of the Proceedings on hand, which is stored at the Philadelphia College of Pharmacy, is at present as follows :

1851, . . .	824	in paper.		
1852, . . .	100	"		
1853, . . .	101	"		
1855, . . .	115	"		
1857, . . .	227	"	22 bound.	
1858, . . .	61	"	22 "	130 loose.
1859, . . .	—		89 "	
1860, . . .	—		208 "	
1862, . . .	—		283 "	
1863, . . .	—		262 "	
1864, . . .	183	"	115 "	
1865, . . .	154	"	28 "	
1866, . . .	72	"	76 "	
1867, . . .	152	"	94 "	
1868, . . .	61	"	145 "	
1869, . . .	105	"	146 "	
1870, . . .	114	"	72 "	
1871, . . .	101	"	68 "	
1872, . . .	99	"	9 "	
1873, . . .	28	"	111 "	
1874, . . .	129	"	58 "	
Index for 1852-1859, . . .			20	in paper.
" 1860-1869, . . .			217	"

The insurance on these books has been continued in the German Fire Insurance Company of Philadelphia, in the sum of \$2500, at an annual premium of \$17.50.

The incidental expenses of the Secretary during the past year, exclusive of travelling expenses, have been as follows :

Telegrams, . . . . .	\$2 05
Porterage and Freight, . . . . .	88 10
Packing Boxes and Packing Paper, . . . . .	16 35
Postage Stamps, .. . . .	100 10
Circulars, . . . . .	14 00
Journals and Binding not otherwise accounted for, . . . . .	41 02
Fire Insurance, . . . . .	17 50
Engrossing and Framing Procter Resolutions, . . . . .	12 25
Total, . . . . .	<u>\$291 37</u>

By comparing the above with the statements of previous years a considerable reduction in the items of freight and postage will be observed. This is due to the low rates of postage for printed matter which prevailed at the



beginning of the present year, and which enabled the Secretary in many cases to send the Proceedings at lower figures by mail than by express. The subsequent advance in the postage to the old figures again increased the cost of delivering the Proceedings to those who were in arrears and subsequently paid up, so that the Association had not only been deprived of the use of the money for several months, but had to pay double the amount of postage, not counting the trouble occasioned to the Secretary in carrying to the post-office the volumes to which the slow payers were entitled.

It is scarcely possible that Congress will reduce the postage on printed matter before the next volume of the Proceedings is expected to be ready for distribution. In this case an increase of at least \$100 for delivering the Proceedings may be expected during the ensuing year.

The Secretary is pleased to state that during the past year arrangements have been made for exchanging publications with several pharmaceutical and other learned societies in addition to those previously published.

Respectfully submitted,

JOHN M. MAISCH,  
Permanent Secretary.

Mr. Mattison read the report of the Committee on Unofficial Formulas (see page 487), and a motion was made to accept and refer the report for publication.

MR. GARDNER.—I should like to make an inquiry whether, when adopting this report, we adopt also those formulas as the formulas of the Association.

THE SECRETARY.—It has not been customary to *adopt* such reports, but simply to *accept* them, and refer them for publication. That has been the usual course, except in one special case which occurred in Richmond. I desire to make an inquiry of Mr. Mattison, having noticed that his report contains a large number of formulas for elixirs; and, knowing that we have a Committee on Elixirs, of which he is a member, I desire to know whether the formulas for these elixirs are contained in that report likewise.

MR. MATTISON.—The formulas for these elixirs are identical with the majority of those brought in by the committee to whom the elixirs were referred. The object of bringing this report in was to try to sweep away this whole elixir business. There has been more or less trouble with it for three or four years, and we thought, as a double-barrel gun is better than a single barrel, the report of two committees being identical would have double the effect.

THE SECRETARY.—Do I understand that we will not have a report from the Elixir Committee?

MR. MATTISON.—We will have a report, but that contains many formulas for elixirs that this does not.

THE SECRETARY.—I move that the report of the Committee on Unofficial Formulas be accepted, with the exception of the formulas for elixirs which

are contained therein, and that those formulas be referred to the Committee on Elixirs.

MR. GARDNER.—It strikes me that the adoption of that report would amount to an adoption of the formulas, and the Association will find itself adopting formulas presented by one or three members.

THE SECRETARY.—My motion is that the report be *accepted*, not adopted, with the exception of the formulas on elixirs which are contained therein, and that those formulas be referred to the Committee on Elixirs.

MR. KENNEDY.—I would state for information, one formula in Mr. Mat-tison's report is not included in the report on elixirs.

THE SECRETARY.—The committee can arrange that afterwards.

THE PRESIDENT.—It is the aim of the Secretary to prevent any duplication of the formulas.

MR. GARDNER.—The object I had in making my suggestion, was to prevent the premature adoption of a set of formulas for elixirs which might prove to be inadequate to the wants of and tend to throw discredit on the Association.

The motion to accept the report, with the exception of the formulas for elixirs, and refer it for publication, was adopted.

The report and annual statement of the Treasurer was read as follows:

TO THE OFFICERS AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

GENTLEMEN: Agreeably to the requirements of the Constitution I herewith present a report of the transactions of this office for the past year. All the bills of which I have any knowledge have been paid, and there is a balance in the treasury of \$1174.11. This sum does not include the Ebert fund, or the amount received for one life membership, which is invested, and the interest of which is only used.

I have endeavored to answer every letter sent me, however trivial, with as little delay as possible, but I regret that many letters are returned to me by the mails. To insure the reception of letters it is necessary that the street and number should be written in the letter. They should be written also under each application for membership. I have obtained the full address of every member when I could do so. I would renew the request previously made that either the Secretary or Treasurer should be informed of all changes, including street and number, as early as practicable after the same is made. Particular care should be taken to write the names plainly, so that the same may be correctly entered upon our books.

Each member, when he joins the Association, promises to return his certificate or diploma when he ceases to be a member. This promise is almost entirely disregarded, and a large number of certificates are in the possession of persons who are not members. I shall report at the next meeting the

names of all persons who have certificates, that should have been returned, for the Association to take action on the same.

Ten years since, 1865, the Association held its Annual Meeting in this city. The whole number of members at that time was six hundred and fifty-four; one hundred and twelve new members were elected at that meeting. During the year there were three deaths; sixteen resigned, and ninety-three were dropped from the list of members for non-payment of dues.

In 1866 the meeting was held in Detroit. Fifty-eight new members were elected at that meeting. During the year seven died, three resigned, and thirty-one were dropped for non-payment of dues.

In 1867 the meeting was held in New York. One hundred and thirty-four members were elected at that meeting. During the year six died, four resigned, and thirty-one were dropped for non-payment of dues.

In 1868 the meeting was held in Philadelphia. Seventy-five new members were elected at that meeting. During the year seven died, fifteen resigned, and twenty-one were dropped from the roll.

In 1869 the meeting was held in Chicago. One hundred and one new members were elected. During the year eleven died, nine members resigned, and thirty-seven were dropped from the roll.

In 1870 the meeting was held in Baltimore. Seventy-eight members were elected. During the year ten died, five members resigned, and thirty-six were dropped from the roll.

In 1871 the meeting was held in St. Louis. One hundred and seven members were elected. During the year eleven died, nineteen members resigned, and twenty-seven were dropped from the roll.

In 1872 the meeting was held in Cleveland. Seventy-four members were elected. During the year nine died, ten resigned and twenty-nine were dropped from the roll.

In 1873 the meeting was held in Richmond. Seventy-six members were elected. During the year fourteen died, nine resigned, and twenty were dropped from the roll.

In 1874 the meeting was held in Louisville. Seventy-six members were elected. Ten died during the year, twenty-one resigned, and one hundred and eight were dropped from the roll.

During the ten years eight hundred and ninety-six members have been elected, eighty-eight have died, and four hundred and thirty-four have been dropped for non-payment of dues. In a few instances the members who had been dropped, with the approval of the Executive Committee, have been reinstated by paying their dues. Among the number who "have passed over the river" are included some who have labored earnestly for our Association, and who were not only its friends, but who were dear to all of us who knew them. May we who remain never lose sight of the examples they have placed before us.

The present number of members is nine hundred and eighty-three. A large number are liable to be dropped from the rolls unless their dues are soon paid. The Proceedings are not delivered to those who are in arrears. So many changes entail a vast amount of labor. During the interim of the

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meetings the affairs of the Association are largely conducted by the Secretary and Treasurer, and I have introduced the above statistics that the Association may have a better conception of the duties performed by those officers.

Your present Secretary and Treasurer were elected in 1865, and you will pardon me if I at this time express my profound regard for the admirable officer associated with me. Our communications have been very frequent, often daily; and during the long time associated together not a single word but of kindness has passed between us, and as years have rolled along this intercourse has ripened into that of dear friends. We have rarely differed in what we believed has been for the interest of the Association. In a very few instances I have received unpleasant letters. When he has known of it, my dear associate has come manfully to my defence. This delightful friendship will remain among very happiest recollections in the milestones of life.

Thanking the accredited agents of the Association for their assistance and advice, and the members for their courtesy and kindness, your Treasurer respectfully closes his tenth report.

*Statement of Receipts and Disbursements of the American Pharmaceutical Association for the year ending September 7th, 1875.*

RECEIPTS.

1874.							
Sept.	8.	To balance on hand as per last Report,			.	.	\$918 22
1875.							
Sept.	7.	To amount received for Contributions,			.	.	4417 50
"	"	"	"	"	from sale of Certificates,	.	197 50
"	"	"	"	"	" " Proceedings,	.	126 97
"	"	"	"	"	" the Ebert Fund,	.	80 00
							<hr/>
							\$5690 19

DISBURSEMENTS.

1874.							
Sept.	12.	No. 1.	James H. Slade, Phonographic Report,			.	\$125 00
"	"	"	2.	C. Lewis Diehl, Report Progress of Pharmacy,			250 00
Oct.	2.	"	3.	John M. Maisch, Expenses,			80 25
"	"	"	4.	American Bank Note Co., Expenses,			55 00
"	"	"	5.	Charles A. Tufts, Expenses,			117 52
"	9.	"	6.	Ig. Kohler, Expenses,			80 40
"	12.	"	7.	C. Lewis Diehl, Report Progress of Pharmacy,			150 00
Nov.	8.	"	8.	James H. Slade, Phonographic Report,			45 00
"	10.	"	9.	William H. Clark, Expenses,			60 00
"	"	"	10.	John M. Maisch, Expenses,			16 85
"	"	"	11.	Ig. Kohler, Expenses,			144 00
"	11.	"	12.	John M. Maisch, Expenses,			150 00
1875.							
Feb.	17.	"	13.	John M. Maisch, Expenses,			81 65
"	27.	"	14.	William Rutter & Co., Proceedings,			291 76

April 1.	No. 15.	Sherman & Co., Proceedings,	.	.	.	\$500 00
" 8.	" 16.	Charles L. Mitchell, Ebert Prize,	.	.	.	80 00
June 20.	" 17.	John M. Maisch, Expenses,	.	.	.	350 00
July 23.	" 18.	Sherman & Co., Proceedings,	.	.	.	800 00
" 24.	" 19.	John M. Maisch, Expenses,	.	.	.	84 12
Aug. 12.	" 20.	Sherman & Co., Proceedings,	.	.	.	300 00
" 20.	" 21.	Sherman & Co., Proceedings,	.	.	.	400 00
" 25.	" 22.	Sherman & Co., Proceedings,	.	.	.	118 51
" "	" 23.	John M. Maisch, Expenses,	.	.	.	250 00
" "	" 24.	Charles A. Tufts, Expenses,	.	.	.	400 00
" "	" 25.	American Journal of Pharmacy, Proceedings,	.	.	.	45 00
Sept. 6.	" 26.	Charles A. Tufts, Expenses,	.	.	.	58 14
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E.E. All of which is respectfully submitted.

CHARLES A. TUFTS,  
Treasurer.

On motion, the report was accepted, and referred to an auditing committee, to which duty the President appointed Messrs. James T. Shinn, of Philadelphia; W. J. M. Gordon, of Cincinnati; and P. E. Dupuy, of Richmond.

The Chairman of the Executive Committee reported the names of the following candidates for membership:

<i>Connecticut.</i>		John M. Phipps, Monson.
L. H. Goodwin, Hartford.		John P. Taylor, New Bedford.
James O. May, Naugatuck.		
John C. Wells, Hartford.		
<i>Maine.</i>		<i>New Hampshire.</i>
Seth D. Wakefield, Lewiston.		Elias S. Russell, Nashua.
<i>Maryland.</i>		Jeremiah Y. Wingate, Dover.
Thomas H. Shryer, Cumberland.		
<i>Massachusetts.</i>		<i>New York.</i>
Louis M. Childs, Greenfield.		A. S. Bischof, New York City.
Charles H. Jaggar, Nantucket.		Charles Dennin, Brooklyn.
O. H. Lillie, Great Barrington.		Horace W. Campbell, New York City.
J. M. Merrick, Boston.		
Richard E. Morgan, Great Barrington.		<i>Pennsylvania.</i>
		Hugo Andriessen, Beaver, Beaver Co.
		<i>Vermont.</i>
		J. E. Young, Vergennes.

The chair appointed Mr. W. H. Jones and Edgar L. Patch, of Boston, tellers, who reported the unanimous election of the candidates.

On motion of Mr. Saunders, it was voted that the suggestions contained in the report of the Permanent Secretary be referred for consideration and report, to the committee appointed for a like purpose in reference to the President's address.

The report of the Committee on Adulterations and Sophistications (see p. 494) was read by the Chairman, A. W. Miller.

MR. CALDER.—I think the names ought to be attached to the analyses, so as to let us know who sell poor articles and who do not.

MR. MILLER.—These are abstracts from different papers, and I have given all the names that are given in the papers.

Before the reading of the report was completed, a motion was made and carried that when the Association adjourn, it be to meet again at 3 o'clock. Following this, a motion prevailed that the Association now adjourn for the regular official visit to the Exhibition Hall; after which the members proceeded, guided by the Committee on Specimens, to inspect the numerous articles of interest displayed there. (See report of committee, p. 526.)

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*Third Session.—Wednesday Afternoon, September 8th.*

The Association assembled at 3 o'clock, President Markoe in the chair. The minutes of the previous session were read by the Secretary and approved.

Mr. Tufts offered the following resolution, which was adopted:

*Resolved*, That the medical faculty of Boston and vicinity be cordially invited to attend the sessions of the Association, and visit the exhibition room at their convenience.

The Secretary read an invitation from the New England Glass Company, inviting the members of the Association to visit the works of that company; also one from the Boston Board of Trade, inviting the members to visit the Merchants' Exchange. Both invitations were, on motion of Mr. Bedford, accepted with thanks.

The Chairman of the Committee on Adulterations and Sophistications resumed the reading of the report commenced at the previous session.

MR. SHINN.—In view of the importance of the subject, both to us and the public, who are the final victims of these outrageous adulterations, and the very able manner in which the Chairman has fulfilled his duty, I should be sorry if this paper was received without some expression of the feeling of the Association. I am sure I echo the sentiment of the Association in saying that the labor and research involved are most fully appreciated. I most heartily move the acceptance and reference of the report.

MR. MERCEIN.—I wish to say in addition, that I am a member of the committee and do not want to shine by the slightest touch of reflected light. Mr. Peixotto and myself had nothing to do with the report, because we could not get at it if we had the ability. I want all the honor to go to Dr. Miller.

The motion of Mr. Shinn was seconded and unanimously adopted.

The Report of the Committee on Legislation (see page 541) was read by the chairman of that committee, and, on motion, accepted and referred.

Mr. Bedford, the Chairman, read the Report of the Committee on Photographic Album, which was likewise accepted and referred. It is as follows:

Your committee would respectfully report, that during the past year they have received nearly one hundred and sixty photographs.

The chairman some weeks ago, through the kindness of the Treasurer, sent a printed circular to each member who had not yet contributed to the album.

The original album has been arranged by placing the Presidents, Treasurers, and Secretaries of this Association, and the subsequent pages are arranged so that the eight photographs of members facing each other, are persons who are from the same locality.

As the new photographs were mostly received within a few weeks, it has been impossible to complete the design of placing the names and location to each photograph.

A new album has also been procured, and a temporary arrangement of the photographs has been made.

These albums, as also that presented by Henry B. Brady, Esq., will be found in the exhibition room.

Signed,

P. W. BEDFORD,  
Chairman.

The Committee on the Ebert Prize was then called upon to report.

MR. MAISCHE.—When the committee was appointed there was no provision made as to how the report should be made. It was provided, however, that the committee should arrive at a decision within six months after the meeting. The committee, after conferring together, thought it best to write a report, and direct it to the President of the Association, and then hand it to the various pharmaceutical papers for publication. The report, which was published in the April number of the various journals, is as follows:

•  
TO THE PRESIDENT OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Committee on the Ebert Prize respectfully report, that they have carefully examined the original essays presented at the Twenty-second Annual Meeting of the American Pharmaceutical Association, a number of which contain more or less valuable contributions to pharmaceutical knowledge; and that they selected for their especial consideration the papers offered by Ottmar Eberbach, of Ann Arbor, Mich., J. Creuse, of New York, and Charles L. Mitchell, of Philadelphia, believing that these approach more nearly to the conditions laid down by the founder of the prize, than the others.

Mr. Eberbach's paper "On Colchicia," is the result of his investigations undertaken with a view of finding a working process for preparing colchicia for medicinal purposes. The process adopted is based upon that of Geiger and Hesse, but considerably modified, and with the adoption of Dragendorff's suggestion of using chloroform for the extraction of colchicia from the alkaline solution. Since this alkaloid is repeatedly subjected to the influence of free alkali and acid, even at a somewhat elevated temperature, it remains uncertain whether the amorphous yellow scales were pure colchicia or contained some colchiceïn. It is to be regretted that the author omitted to prove



the acicular crystals finally obtained from a concentrated solution in chloroform, to be pure colchicia and not colchicein, which latter, however, according to Hübler and Oberlin, is obtained in an amorphous condition from the chloroformic solution.

Mr. J. Creuse's essay on "Iron by Hydrogen," is deserving of commendation for two reasons: 1, for establishing the true character of what is usually found in commerce under this name; and 2, for determining the comparative value of the different processes that have been recommended for estimating the amount of metallic iron contained in this preparation. Its quantitative estimation by the amount of hydrogen evolved in the presence of dilute muriatic acid appears to be feasible; but further experiments are necessary to determine the influence which the presence of the various oxides mentioned by the author may exert upon the amount of gas obtainable.

The paper entitled "The Active Principles of the Official Veratrums," by Mr. Chas. L. Mitchell, is divided into three parts, entitled "Botanical," "Chemical," and "Physiological." In the first part we miss a sufficiently critical account of the botanical origin of *sabadilla* seeds; although attributed by the United States Pharmacopœia to *Veratrum sabadilla*, Retzius, the seed, according to all modern authorities, is obtained principally, if not exclusively, from *Asagracea officinalis*, Lindley. While the close similarity in appearance and structure of the rhizomes of *Veratrum viride* and *album* is particularly dwelt upon in this part of the paper of Mr. Mitchell, the second part does not produce any evidence that it was really and solely the rhizome of the former which was used for the experiments, except what is deducible from the physiological results in Part III, and from the slight differences in the behavior of the two alkaloids obtained, besides *jervia*, all reactions being essentially identical, except the fusing-point, which for *veratroidia* is given at 265° F., and for *veratralbia* at 340° F.; and the behavior to bichloride of platinum with which *veratralbia* is stated to yield no precipitate, while *veratroidia* produces a flocculent yellow precipitate; but the strength of both solutions has not been given.

The botanical similarity of the American and European *veratrum* had long since suggested the idea of the identity of their constituents, and this belief was strengthened by the positive proof of the absence of *veratria* from both, and by the physiological results of Schroff, which indicate a qualitative similarity if not identity of composition. The recent discovery of *jervia* in *Veratrum viride* by Dragendorff, which result has been corroborated by Mr. Mitchell, furnishes further proof for this assumption.

The main results of Mr. Mitchell's investigations as they appear to the committee, on comparison with the results of other investigators, may be summed up as follows:

1. The alkaloid, heretofore named *viridia*, is *jervia*, and is found in both *Veratrum album* and *V. viride*.
2. The alkaloids named *veratroidia* and *veratralbia* are probably different, though positive proof of this fact has as yet not been adduced.
3. These alkaloids cannot, probably, be profitably extracted for medicinal use; and

4. The pure resins of both rhizomes are nearly, if not entirely, inactive.

After full deliberation upon all the above points, and considering the labor involved in the experiments of the subject-matters of the three papers, the committee award the Ebert Prize of the American Pharmaceutical Association, for the year 1874, to Mr. Charles L. Mitchell, for his essay "On the Active Principles of the Official Veratrums."

In conclusion, the committee desire to state that their labors would have been very considerably lightened if the essays in question had been accompanied by full lines of specimens.

CHARLES BULLOCK,  
W. H. PILE,  
JOHN M. MAISCH.

PHILADELPHIA, March 9th, 1875.

The report was accepted, and referred for publication.

The Committee on Maximum Doses requested that the reading of their report be laid over until the fourth session, and the request was granted.

Mr. McIntyre, from the Committee on Formulas for Elixirs, read the report of that committee (see page 489), and a motion was made that it be accepted and referred for publication.

MR. BEDFORD.—We have already one set of formulas. Is it proposed now to do away with those formulas that have been recommended and published throughout the country, and substitute them by the formulas of this report on elixirs?

MR. BAKER.—It is only moved that the report be accepted. It was not to be referred for publication, as I understand it.

MR. BEDFORD.—What disposition is to be made of it now if it is accepted?

MR. BAKER.—That is another question.

MR. GARDNER.—Some of those formulas seem to be somewhat defective. I would like to know if they are to be indorsed as the action of this Association, or not? because, if they are to be indorsed by the Association as a body, I think it would be to the discredit of the Association in some respects. The solution of the alkaloids is made in alcohol. It is then added to the vehicle. Those alkaloids will deposit unless in the presence of a little citric acid. I have seen that to be the case. A crystalline deposit takes place where they are dissolved simply in alcohol. I think there may be some other little inaccuracies about them, and we should regret adopting them. That question requires more consideration, it seems to me, than the Association has given it if it is to be adopted as official. We ought to be careful what action we take. The formulas adopted at our Twenty-second Annual Meeting have been found fault with very considerably throughout the country. The preparations made with them have been quite unsatisfactory in some respects, and I

have heard considerable ridicule thrown upon the Association in consequence of those formulas. They were very creditable, but there were certain points about them that could only be acquired by time and practice. I think time and practice should be given for experiment among the members before we adopt any such formulas.

**MR. MATTISON.**—These formulas do not direct the solution of the alkaloids, but the alkaloid sulphates in the alcohol menstruum.

The origin of this Committee on Elixirs I suppose the gentleman understands. A series of formulas for elixirs was presented by the Chicago College at our last meeting, and they were placed in the hands of a committee for reconstruction and further experiments. That committee have gone to a great deal of trouble to experiment upon that subject, and they feel that the subject has been pretty well ventilated. I would, therefore, move their adoption.

**MR. GARDNER.**—Has the subject been so well ventilated that the gentleman knows that any such reaction takes place?

**MR. CREUSE.**—I would ask to have a formula read over again. It seems to me there is something wrong with that formula for elixir of pyrophosphate of iron, quinia, and strychnia. I have had some experience in making that elixir, and I do not think you can keep in solution more than four grains of quinia.

**MR. GARDNER.**—I would like to ask whether the gentleman has found it necessary to add a little citric acid as a means of keeping the alkaloids in solution?

**MR. CREUSE.**—I have found it to be better.

**MR. GARDNER.**—I have found there was a deposit where it was not done. I have seen it deposit.

**MR. EBERLE.**—I think we just got an explanation from Mr. Mattison, who, I believe, had something to do with the furnishing of the formulas, and, if I recollect his remarks rightly, there has been some mistake in entering the alkaloids themselves in the recipes instead of the salts of the alkaloids. Mr. Mattison stated that the formulas referred to the sulphates of the alkaloids.

**MR. MATTISON.**—That was in connection with the cinchona alkaloids, not this elixir.

**MR. EBERLE.**—Besides that, it occurs to me it makes little difference what set of formulas the Association adopts. The general sense of this Association has been against elixirs, probably as tending towards homœopathy. I do not want to see drugs and medicines thrown to the dogs. I believe there is merit in them, but they must be given in medicinal doses. So it does not matter which series we adopt. It is probably well we should have some, but, in a majority of instances, what is placed in the elixirs is not always held there. Very generally, when filtration goes on after a few days, a good deal of the medicinal agent is removed. This committee has given a great deal of time and attention to this matter, and have practically tested a number of the recipes, and know them to be good ones, so far as elixirs can be good for anything. Consequently I am heartily in favor of the adoption of this par-

ticular report, because it occurs to me we can, in this session, give sufficient discussion to the matter to modify any little discrepancy that might occur, so as to adopt it permanently. At any rate, if we do not propose to accept this paper it ought to be referred back again to the committee for action.

MR. MERCEIN.—Wine of pepsin does not amount to much. I notice the chairman of that committee spoke of using half a drachm of hydrochloric acid to be added to the mixture of pepsin, glycerin, and water afterwards. As the object of using the hydrochloric acid is to make the pepsin dissolve, it strikes me that using it afterwards is like a man putting on his shirt after he puts on his coat.

MR. GARDNER.—It has been to the discredit of the Association that formulas have been adopted which are not practicable. That difficulty will continue if we adopt hastily and without consideration any formulas that are offered to us. That is the only object I have in suggesting that the matter should have that thorough consideration which is due to our sense of dignity before we adopt a set of formulas. Outsiders look to us for formulas. Any formula we bring forward they are ready to use, and, if they find they are impracticable, that they are not in some instances half so good as some private formulas, it is to the discredit of this Association if we adopt them.

THE SECRETARY.—I should like to ask the gentleman whether he has reference to any particular formula.

MR. GARDNER.—I have heard in a general way in regard to many of them that such ones would not keep, and also of some difficulties in regard to the coloring matter, which is apt to change.

THE SECRETARY.—I believe the greatest difficulty was with the elixir of cinchona, and the compound elixir of cinchona. It was made according to the Association formula from the cinchona bark, and not from the alkaloids. I know of quite a number of our friends who used the formulas, and were very well satisfied with them.

MR. MCINTYRE.—The committee have considered that the main question was the question of nomenclature, and whatever errors in the formulas appear are probably owing to the fact that it was impossible to get up a set of formulas to agree with the commercial use of them. In this particular elixir of pyrophosphate of iron, quinia, and strychnia, the formula that was adopted by the Association contains sulphate of quinia. The committee felt the necessity of calling it elixir of sulphate of quinia, with citrate of strychnia and pyrophosphate of iron.

MR. BECKER.—On account of the general dissatisfaction that was manifested with some of the formulas that were adopted by the Association at the former meeting, it seemed desirable to remedy some of the defects, and our college has, during the last year, in conjunction with the Medical Society of the District of Columbia, overhauled some of those formulas. It fell to my lot, in connection with gentlemen like W. S. Thompson, of Washington, and Mr. Gaither, to give this subject close attention. We have been at work for about six or seven months on this line of elixirs, and I must state that, in many instances, after thinking that we did exactly the right thing, after a

month or two we discovered we were decidedly wrong. I don't think a formula can be adopted unless it is proven by time. I would also like to call attention to the coloring matter that is used in these elixirs. Cochineal is not a fit coloring matter for any elixir that is to be used as a general vehicle. It is decomposed by acids. It is decomposed by other matters which are continually brought into contact with a general vehicle, such as a simple elixir should be. For these reasons, I think it would be well to have a little closer examination into these formulas before they are adopted as the formulas of the Association.

**MR. WELLS.**—There is one objection I have to the paper, and that is this, there are too many formulas altogether. There are only some six or eight that are in general use, so far as my place is concerned; and, inasmuch as we discourage elixirs as much as possible, I think we ought not to adopt any more formulas than are absolutely necessary. I agree with the gentleman who spoke last in regard to coloring matters in elixirs. They should be kept out altogether. They have no business in any elixir.

**MR. BIDWELL.**—I would like to inquire what authority our recommendation as a body carries with it. For instance, I would like to know, if it could be ascertained in any convenient way, how many of the members of the Association habitually use the formulas recommended by the Association two years ago. I suppose we all use, or try to use, the formulas of the Pharmacopœia in making the preparations mentioned in the Pharmacopœia. Do we give the same authority to the formulas mentioned by the Pharmaceutical Association? I have not found it to be so in my own experience. So far as my observation is concerned, I think they have been merely looked at by the members and others and compared with other formulas, of which we have a flood, and perhaps tried; but we have adopted individually the formula for each elixir that suits us and our customers the best. I think it is not necessary for us to say these are the formulas we recommend. It may be well for us to publish them, and suggest them, but I think we should not stake our reputation as an Association upon the excellence of these formulas, although I have no doubt they are good ones. My impression is that the former formulas, so far as I tried them, were rather unsightly. I did not like, myself, the coloring matter, and so far as I have found the tendency of the physicians where their attention is called to it, is to reject colored, and use in preference light elixirs. I would also like to know how far the members of the Association have been successful in calling the attention of the physicians to the use of a simple elixir in prescriptions.

**MR. BECKER.**—When the committee (in whose charge was placed this matter that I spoke of) from our college, of which I happened to be chairman, was appointed, our instructions were to adhere as closely as possible to the formulas adopted by the American Pharmaceutical Association, if practicable to do so, and I certainly think we looked upon the action of the Association as authority where we could possibly find it.

As to the matter of interesting physicians in the formulas, that has also been one of the points that we have made a specialty. It was for that reason we co-operated with the Medical Association of the District of Columbia.

The different formulas were given, and they were consulted as to the doses that they desired of medicinal agents in the elixirs. That I think is the great requisite to be attained if such a thing is done at all. We can adopt formulas by the million, but if physicians will not prescribe them, they will be as good as so much waste paper.

**THE SECRETARY.**—At the meeting in Richmond, the Secretary was directed to communicate the formulas that were then adopted to the various medical associations throughout the United States. This was done, but very few replies from the medical associations were received, as the Secretary stated in last year's report. In the meantime, however, a demand has arisen for the formulas. I know that pretty well, because I have had at least two hundred applications from apothecaries and druggists, who are not members of the Association, for the formulas of the elixirs of the American Pharmaceutical Association. It evidently shows that a demand has arisen somewhere throughout the country, and I know we have sent them all over the country.

**MR. KENNEDY.**—This Committee has gone to a great deal of trouble. They have been experimenting on these elixirs for the last year. They have made over one hundred experiments, which were not made in a moment or two. The preparations were allowed to stand, and were tested and proved to be a success. There was, I think, four, six, and eight grains of quinia used; with eight grains to the ounce. I found no precipitate, and I believe it was the experience of the balance of the committee. The preparations or the formulas presented by Mr. Hancock, of Baltimore, are not, as has been stated here, all of them unsightly. I beg to differ with those who think so. There were, perhaps, two or three of them unsightly, and those were the preparations of cinchona bark. The balance of them, I think, seemed to please most of the pharmacists that tried them, with the exception of the cinnamon odor being too strong. We recommend the alkaloids and their sulphates, because we think they make pleasanter and handsomer preparations, and we arrived at the conclusion which has been reported here by the chairman. I hope this thing will not be passed over, but that the members will express their views upon the matter at this session.

**MR. SAUNDERS.**—I think the object in introducing these formulas for elixirs was not to multiply the number of formulas, but to lessen them. The great design has been all through to arrive at uniformity in these preparations. I know in Canada, until the publication of the formulas by the Association, there were no formulas used for elixirs to any extent, but since then those formulas have been very generally used by the druggists throughout the country. The simple elixir has been found very difficult to filter so as to have it clear, and I think that was one of the objections to Mr. Hancock's formula that was urged at a former meeting. I suppose this difficulty, as well as all other difficulties, have been got over by the committee who have been working so earnestly in this matter, and if the Association have confidence in the gentlemen who have been at work all this year, I think we should be quite as safe in adopting their conclusions now as by referring it to another committee for future report. For my part, I should like to have this thing settled at this

meeting, so we can sit down quietly and use them as far as physicians order them.

**MR. KENNEDY.**—We not only experimented with various simple elixirs, but we tried the formulas presented by the different colleges throughout the land, and after giving them a fair trial, allowing them to stand three, six, and nine months, we came to the conclusion which has been reported.

**MR. MATTISON.**—I will state that this report is a year's deliberation of this committee, and the series of formulas that were proposed by the Chicago College have been modified and improved in such manner as the committee with the time it had at its disposal could improve them. They have had a year's trial.

**MR. MCINTYRE.**—In regard to the formula for simple elixir, the committee came to the conclusion, that one way of getting rid of the difficulty of getting a clear preparation was to leave some of the oils out, and they found the preparation so far as taste and odor was concerned was suitable for the purpose. It was even yet a little difficult to get a clear preparation. In regard to the elixirs of bromide of potassium, valerianate of ammonium, and others, those formulas were introduced to show how easy any physician might have any kind of elixir he wanted. We put no directions how such elixirs are to be prepared, considering that probably eventually that would be the way in which they would be ordered. It matters not if the elixir is not quite clear in mixing an ordinary tincture, and we took that view of the matter that probably we had better put no addition to it whatever. Regarding the preparations in which the sulphates of alkaloids are concerned, we laid more stress on the fact of whether the Association would be willing to allow of the introduction of the explanatory name. It was done with a view of affording those members who were compelled to dispense preparations of bark and iron some opportunity of avoiding this black mixture, which you all have met with; and we thought we had better present the subject in that light to the Association, and leave it in their hands to determine whether they were willing to allow us that liberty.

**MR. MATTISON.**—I don't think very much objection should be made against the excess of formulas presented by the committee. I believe there are only twelve or fourteen formulas, and they are given as a guide to show in what manner the other elixirs may be prepared. When we think of the manufacturers of elixirs, two of whom I have in mind, one of whom has one hundred and twenty-seven kinds, and the other one hundred and thirty-five, on his list, I think the committee has been very modest in the formulas for these elixirs.

**MR. GARDNER.**—I would like to make one other remark. I object to the name proposed for the elixir of ammonio-citrate of bismuth, which is called elixir of bismuth.

An amendment to the original motion was made, that the formulas offered be referred to a special committee, to be reported upon at some future session. Mr. Saunders moved an amendment to the amendment, that the formulas be adopted



by the Association. Mr. Saunders's motion was seconded by Mr. Eberle, and the question being taken on this amendment, it was carried. The question recurring on the original motion as amended, viz., that the report of the Committee on Elixirs be accepted and referred for publication, and that the formulas be adopted by the Association, it was carried.

The Committee on the Publication of Papers in Advance of the Proceedings, presented the following report, which was read by the chairman, Mr. A. W. Miller, and then accepted:

**REPORT OF THE COMMITTEE ON PUBLICATION OF PAPERS  
IN ADVANCE OF THE PROCEEDINGS.**

The committee appointed to consider the feasibility of furnishing copies of papers read at our meetings to pharmaceutical journals in advance of their publication in the Proceedings, would respectfully invite the attention of the Association to the following points, which occurred to them in their deliberations on this subject:

The main arguments which are adduced in favor of this project seem to be, in the first place, the allegation that the present system is unjust and illiberal towards authors in withholding the fruits of their labors for so long a time from publication. Secondly, the fact that by such action the Association places itself in the position of claiming an exclusive proprietary ownership of these papers, which conduct appears to be contrary to our professed principles, and entirely unworthy of a scientific body. The suggestion made by Dr. Squibb at the Richmond meeting is also worthy of consideration, namely, that by our present custom, we may deter some of our members from bringing valuable papers when they are desirous of having these essays published at an early date.

The first of these statements has been answered by our Permanent Secretary, who, by means of a new method of arranging the subject-matter, has succeeded in issuing the last Proceedings more promptly than heretofore, and who feels confident of being able to do still better in future. The stigma on the fair fame of the Association of claiming even a temporary copyright, we propose to remove by a resolution which we are about to offer.

In order to enable the members present to decide the case intelligently and on its own merits, we have thought it best to enumerate a few of the chief objections which have been made against the introduction of this innovation. We believe the following to be an impartial summary of that which has been urged against the indiscriminate publication of the papers under consideration:

As we all know from experience that only about twelve per cent. of our members attend the annual meetings, the chief benefit which the remaining eighty-eight per cent. derive from their membership is their copy of the Proceedings. The value of this volume will undoubtedly be somewhat impaired if all of its most interesting papers have been already offered to the public.



It was stated at the last meeting that many members had censured the officers on account of the formulas for elixirs, etc., having been forwarded to medical societies in advance of the publication of the Proceedings. It has been alleged that instances of a similar character would most probably multiply under the new system. When papers are removed from the custody of the Association, this may occasion a vexatious delay in the issue of our Proceedings, besides the danger of losing the documents altogether in their peregrinations from one journal to another. It would be almost impossible to avoid a charge of favoritism in the selection of the journal for the first publication of the more desirable papers.

In view of these arguments, we feel in duty bound to remonstrate most decidedly against the loaning of original papers read at our meetings, as being both undesirable and impracticable. We cannot regard it otherwise than as a positive injustice to the officers of our Association to permit the removal of such documents from their possession, feeling convinced that such action would be an unwarranted addition to their already onerous labors. The only exception to this would be in the case of the recommitment of a paper to its author, when there should always be a tacit understanding that no third party should have access to it. Still, in order that we may not be accused of endeavoring to monopolize the dissemination of pharmaceutical knowledge, we offer and recommend the adoption of the following resolution:

*Resolved*, That the various pharmaceutical and medical journals are cordially invited to publish whatever notes they may desire to make of our Proceedings and of the scientific papers which are read before our meetings.

As far as the main question is concerned, your committee are of the unanimous opinion that the most equitable method of disposing of this would be to leave the subject optional with each author, provided of course that no embarrassment will be caused by this arrangement to our officers. This seems to be by far the simplest and fairest way of reconciling the opposing views of different members. We offer therefore the following resolution:

*Resolved*, That when authors of scientific papers have prepared copies or abstracts of their essays previous to the meeting of the Association, they shall be at liberty to distribute such copies or abstracts at any time subsequent to the official reading of their respective papers.

ADOLPH W. MILLER, *Chairman*,  
J. F. HANCOCK,  
OTTMAR EBERBACH.

On motion, it was voted that the resolutions appended to this report be considered seriatim, and the first resolution inviting pharmaceutical and medical journals to take notes of the Proceedings and papers, was laid before the Association.

MR. BULLOCK.—I would like to inquire of Dr. Miller whether he means these papers shall be laid open and accessible to any person who desires to make copies, or that they shall take notes as they are read?

**MR. MILLER.**—I mean, to take notes as they are read. They are always to remain in the custody of the officers of the Association.

After this explanation the resolution was adopted, and the second resolution, referring to the publication of papers, after having been read at the meetings, was read.

**THE SECRETARY.**—This is a very important resolution, and I wish to draw particular attention to it; that after a paper has come before the Association it is not to leave the Secretary's hands, but that the copies must be prepared beforehand, and the publication is allowed afterwards.

**MR. MILLER.**—And that is the exact intent of the resolution.

**MR. EBERLE.**—We had yesterday an example where the wording was such as to render a meaning obtuse, and some difficulty originated in the Association. Now if the wording covers all the ground, and it occurs to me the Secretary can judge of that matter, let us adopt it as it is written; otherwise, let us modify it, and arrange it so there will be no trouble in the future.

**THE SECRETARY.**—I believe it covers exactly the ground.

**MR. KETTEL.**—Under the resolution, if I understand it aright, all these papers are liable to be published in other journals in advance of the official publication by the Society. Am I right?

**MR. BULLOCK.**—That question has been before this Association before. It is one, perhaps, of more importance than is thought by a great many members of the Association. I am in favor of the greatest amount of liberality in the direction of the dissemination of information, and what I have to say is not with the intent of discouraging abstracts of any paper being published, but there is a serious question of the propriety of publishing in full any paper which is read before this Association prior to its appearing in our Proceedings. The first effect of that will be to immediately lessen and depreciate the value of that large book which we publish at a great expense each year. We have a great many members of our Association who never appear at our meetings. They become members for the benefit which they are going to receive from the work of the Association. Now they are business men, many of them, and the cheapest way they can get information they will be likely to appeal to. If they can get the information upon these subjects without paying their subscription to this Association, and get it through other channels, I am very much afraid that a great many of our members who do not attend will lose their interest in this Association. Now that seems at first, perhaps, a very narrow view, but I am very much afraid we will find it will work a good deal in that way, and I think the publication in full of papers prior to their appearing in our Proceedings is a matter of very serious consideration.

**MR. EBERLE.**—I think Mr. Bullock is right. Quite recently a gentleman told me he did not consider it necessary to attend the American Pharmaceutical Association for the purpose of getting antiquated information. That he had access to it almost immediately upon the adjournment of the Association, and that was sufficient for his purpose. Still, while I concur with Mr. Bul-

lock that it does seem a narrow-minded view, I think we should adopt his suggestion.

**MR. MILLER.**—Under the resolution there is only one way for a paper to get full copies, and that is through the instrumentality of the authors themselves, and if we prohibit them from doing that we may prevent them from bringing those papers altogether. It would seem to the committee as though that was the only way of reconciling the different views of the members. A very large majority of the members are in favor of having these papers published whenever the authors wish them published.

**MR. MATTISON.**—If any gentleman presents a paper, and makes a copy previous to the reading, can we prevent him from giving that to any paper he sees fit?

**MR. BULLOCK.**—We can avoid publishing it in our Proceedings as not being an original. That is often done where a paper has been sent as an original paper which has been published in another journal; it is declined. Now I know that we are all a little ambitious, and I am very much afraid this opens the door, and gives the author of a paper the privilege of sending it to two or three papers, and having it published all over the country. If I understand the resolution, you leave it optional with the author, after the reading, to furnish copies to one or more journals at his discretion.

**MR. CREUSE.**—The journals will not publish any papers unless they are good. And anybody that has written a good paper likes to see it published soon, because another may take the wind out of his sails, and publish the same here or in Europe. I think there is no harm in giving permission to writers to give their papers to other publications, else they will not send them here. They do not like to have them lie five or six months while others have publicity.

**MR. EBERLE.**—The object of Mr. Bullock is not to prevent the publication of those papers in their journals, but if they are presented here as original this Association will have the privilege of publishing them first in its Proceedings. After that they could be at the disposal of as many journals as wish to publish them.

**MR. BIDWELL.**—Have not the gentlemen laid too much stress upon the benefit that the members are to derive from the Association? There is another side to it. This Association is essentially and mainly not for the purpose of benefiting ourselves, but for the benefit of the community. I remember very well some years ago, when I first heard of the Association, it occurred to me it would be a good thing, and I wrote to a valued correspondent whether I should get any benefit for my five dollars a year. He answered: "You will get some good. You will get the volume of Proceedings, which is a valuable book; but that is not the main question. The main question is that your five dollars will do good to the community. This Association is for the benefit of the public, for the diffusion of useful information, and you ought to support it." I think that is the true argument. I have used it myself with others who talked of attending the Association. I think it is the true ground upon which to base our membership. Not entirely, not mainly for the benefit of

ourselves, but mainly for the benefit of the public, and on that ground I think the authors should be allowed and not discouraged from offering their papers to the public, not only through us, but also through the papers.

At the request of Mr. Rice the first sentence of the resolution was again read by the Secretary.

MR. RICE.—I think if we strike out the word copies and leave abstracts, that will cover the ground. It is customary to publish preliminary notices of new discoveries or observations in the journals, with a statement that the full article will appear in another journal, or in the same journal at some future time, whenever the author finds time to write it out in full; and if we give the authority to make abstracts, and give the results without stating the experiment or the authorities upon which they have based their researches, that will be quite sufficient. We should put some curb upon them, because we will not get people to read our Proceedings if they are published beforehand. I suggest to strike out the word copies and leave the word abstracts.

MR. SHINN.—An abstract may consist of the whole paper with the exception of a few words; so that would not cover the ground at all. Another thing, I think from the past experience of this Association, we need not fear that many authors will take the trouble to make two copies. It is with some difficulty we can get a complete copy for the Association in time, and if they wish to have their articles published they will not bring them to this Association but publish them in the journals. I do not believe we will lose one paper a year from adopting the resolution.

MR. EBERLE.—If we had taken Mr. Shinn's view of the subject when the article was ingrafted into the by-laws, in relation to membership, we should not have got into the difficulty yesterday. I am in favor of having this so worded that there will be no loophole of escape in any way. The Secretary is satisfied with it, which goes far toward satisfying me.

THE SECRETARY.—I desire to state, that the view I take of the matter, as the editor of the Proceedings, is, in the first place, to look to justice to the writers of the papers. For many years past, the Proceedings never appeared until about six months after the meeting had taken place. I think I can safely promise that every member who is entitled to a copy will have his copy of Proceedings, say, within four months, even if the book should be a little more bulky than the last one has been. I was formerly very much in favor of giving almost unlimited opportunity to authors to publish papers after they had been read here. The experience which I related last year brought me back a little from my first opinion. Members have complained that certain matters had got into public print, and that others who were not members had the benefit of it before they derived it. It is a very difficult matter to reconcile all interests and all views. When we take into consideration that the papers which are read before the British Pharmaceutical Conference, are invariably published in full in the London Pharmaceutical Journal, I think we may take that as a safe guide that the members of this

Association will not look upon our Proceedings as entirely worthless, even if every paper had been published in the journals. The arrangement that the Association has recently made, will give every year a full and complete report on the progress of pharmacy during the preceding year. That is certainly of some consideration. I contend that that report alone is worth all the money any member pays for his annual dues. At any rate, I suppose that only a comparatively small percentage of the papers which are read here will get into print if that resolution is passed. The only addition I should like, so far as I am personally concerned, to have made to this resolution is, that a paper should be published with the statement that it has been read at the meeting of the American Pharmaceutical Association, so as to give the Association credit for it.

The chairman of the committee accepted the suggestion, and the resolution was then adopted in the following form :

*Resolved*, That when authors of scientific papers have prepared copies or abstracts of their essays previous to the meeting of the Association, they shall be at liberty to distribute such copies or abstracts at any time subsequent to the official reading of their respective papers; *provided*, that the papers are always headed in publication by the statement that they have been read at our meeting.

The report of the Committee on the Liebig Memorial was read by the chairman, accepted, and referred, as follows :

**TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.**

The undersigned respectfully reports that with the consent of the two other members of the Committee on the Liebig Memorial, he has issued, through the pharmaceutical press, an appeal to the pharmacists and druggists of this country to participate in the undertaking by contributions of money, which the committee is authorized and ready to receive.

The undersigned would request the members of the Association to hand over their contributions to the Treasurer of the Association, or to himself. The names of the donors will be duly recorded, and the amount forwarded to the Chairman of the Central Committee.

PAUL BALLUFF,

Chairman Committee on Liebig Memorial.

Boston, Mass., September 8th, 1875.

Mr. Bedford called up the amendment to the by-laws, notice of which was given at the first session.

Mr. BEDFORD.—I move an amendment to Article I, Chapter 7, of the By-laws. The amendment relates to the teachers of pharmacy, chemistry, and botany, who are eligible to membership. The clause now reads, "And those teachers of pharmacy, chemistry, and botany, who may be specially interested in pharmacy and materia medica, who after duly," etc. I propose

to have it read, "Teachers of pharmacy, chemistry, and botany, *in established schools of pharmacy.*" That is the only alteration, striking out the words, "who may be specially interested in pharmacy and materia medica," and substituting the words, "in recognized schools of pharmacy."

MR. SHINN.—Recognized by whom?

MR. BEDFORD.—By the Association.

MR. TUFTS.—In the Convention of Teaching Colleges.

MR. SHINN.—My question arose from a little circumstance that has taken place in Philadelphia. There is a law to prevent any one from entering into the drug business who is not a graduate of a college of pharmacy, and there is a little institution on Ninth Street, known as the University of Philadelphia, which has been manufacturing diplomas for medical men and sending them all over the country. On the passage of this law in our State, this university gave notice through the public press that they had established a school of pharmacy. The result is, that any man that wants to open a drug store in Philadelphia goes to this university, pays ten or twenty-five dollars, and becomes a graduate in pharmacy from this school of pharmacy; the question now is, whether the examining board shall recognize these parties or not. That is the reason I asked whether the words "recognized school of pharmacy" is sufficiently definite.

THE PRESIDENT.—I suppose the same objection would apply to the word "established."

MR. SHINN.—This is established on a money basis.

THE SECRETARY.—I would suggest we postpone it until to-morrow morning.

MR. BEDFORD.—I will withdraw it for the present, and present it to-morrow morning.

The subject was withdrawn, and the Chairman of the Committee on Papers and Queries proposed to proceed with the reading of scientific papers, which was agreed to.

Query No. 3, on the Quality of Commercial Sugar-coated Pills, was continued to Mr. David Hays for another year. A volunteer paper by Joseph P. Remington, on an allied subject, entitled "The Ready-made Pills of Our Day" (see p. 620), was read, accepted, and referred.

MR. EBERLE.—In most of the experiments made in reference to the solubility of sugar-coated pills, the experiment was not fair to the pill. It was not made under the same conditions that a pill would meet with in the human stomach. If experimentalists would take the trouble to digest the pills, not by making a personal application by means of their own bodies, but by preparing a suitable menstruum, and place the pills in it, together with some pepsin (Mr. Scheffer, of Louisville, would have been a proper person to attend to the matter), at a temperature of 98°, we would know whether sugar-coated pills will be digested. I know that many sugar-coated pills, when the inves-

tigation was carried to that point, in the passage through the human body, have not been digested, but have been returned without much alteration. The sugar was dissolved, but the pill was there. I throw this out in the hope that some member will carry this farther than it has been carried, and give us a paper on the subject.

**THE SECRETARY.**—If the gentleman had listened closely to the paper his remarks would probably have been different. One of the experiments was, the pills were digested in water at a temperature of 80°, and shaken every three minutes. The next experiment was with water at 98°, shaken every three minutes. Then one fluid ounce slightly acidified. And lastly, with water at 98°, containing a trace of pepsin.

**MR. GARDNER.**—I believe chalk is frequently mixed with the sugar, interfering with its solubility.

**MR. KENNEDY.**—I know also that pills which were not sugar-coated were passed by a stool without being dissolved. So it does not hold good that sugar-coated pills only do that, but also others that are not sugar-coated.

**THE PRESIDENT.**—The use of an improper excipient might result in the insolubility of a pill as well as the sugar-coating.

No reply having been received in answer to Query No. 4, on the Progress of Manufacturing Medicinal Chemicals, it was referred to the Committee on Queries; and Query No. 5, on Tasteless Iron Preparations, was called up.

**THE PRESIDENT.**—That query was referred to me, and one of the members of the Association in Boston agreed to work out the subject, but did not have time. I never accepted the query; but as on various occasions, when queries have been referred to me, I have tried to get some one here to answer them.

**MR. SAUNDERS.**—I have a volunteer paper on this subject from Mr. Rutter, of New York. Mr. Rutter, it appears, is not a member of the Association. It remains for the Association to consider whether they will hear it read, the gentleman not having any claims on the Association in this way.

**MR. SHINN.**—I move it be referred to the committee to report to-morrow.

Mr. Shinn's motion was agreed to, and Query No. 6, referring to the quality of and substitutes for filtering-paper, was then, on motion, continued to Mr. Talbot for another year. The same disposition was made of Query No. 8, on the Cultivation of Medicinal Plants in this Country, accepted by Mr. B. O. Wilson.

An essay on Paraffin (see page 629) was read by Mr. B. F. Stacey, in answer to Query 9, and referred.

**MR. BABCOCK.**—I desire to say a word on this subject. I have given con-



siderable attention to the subject of paraffin and its uses as a substitute for wax in ointments and cerates, and as the result of that experience I think I may say that pharmacists have neglected this very useful substance far too long. It is the perfection almost of a neutral substance. It does not decompose, it does not grow rancid, but the difficulty which pharmacists encounter is in its crystallization, which may be almost entirely overcome by the addition of a small percentage of wax. It is also true that quite a number of different varieties of paraffin are in the market, which are all sold under the general name of paraffin. Some melt at a high and some at a low temperature. I have made simple cerate, using instead of the wax, a mixture of three parts of paraffin with one of wax. And I believe, in cold cream, that such a mixture is better than spermaceti. It certainly is cheaper, and it makes an ointment equally white, and I think an ointment which might be preserved without decomposition for a greater length of time. I have used it for some novel purposes, and though I have no paper to present upon the subject, I should like to make a few remarks upon the use of paraffin in connection with wax as a substitute, when combined with lard oil, for lard itself in ointments. I suppose there is no single substance which has troubled pharmacists, more especially in warm sections of the country, than lard. It is always a trying task to prepare this substance. There are a great many different ways of purifying the lard, and pharmacists are very much disagreed upon the best methods of purifying it. It decomposes sometimes according to conditions which are not well understood, and when great care has been taken in the preparation of lard, by rendering it in the most careful manner, we find it in a month or six weeks in a worse condition than some we had made with far less care. Now it is a fact, which is accepted by chemists generally, that fats and oils, in a perfectly pure condition, do not tend to spontaneous rancidity. It is simply a decomposition, which takes place in consequence of the decomposition of albuminous matters introduced into the lard in the process of manufacture, and if these be removed in the first place, if the lard be made perfectly pure, so as to consist only of olein, margarin, and stearin, it does not decompose. I have in my possession some lard oil which I have had a year and a half or two years, and it is as sweet at present as it was the day when it was made. Now, as a substitute for lard, I propose in the first place to use for one ingredient lard oil, which is an ingredient in lard itself, amounting to 60, 62, or 68 per cent. Lard oil is pressed from lard in the cold, and does not have dissolved in it those elements which tend to make it decompose so much as ordinary lard. We know that lard oil may be kept longer than lard itself. The best quality of extra No. 1 winter-strained lard oil will keep for a long time. I propose to use that pressed lard oil to take the place of that fluid portion or olein of lard, which exists in lard itself; instead of the stearin and margarin I propose to use this substitute, consisting of paraffin, three parts, and of wax, one part, by first making a mixture of them, and then taking such a quantity of it as, with the lard oil, will make up the percentage of lard. That is to say, I would first make up what I would call the wax substitute, three parts of paraffin to one part of wax, and then take sixty parts of lard oil, by weight, and forty parts of this substitute, by weight, or thereabouts, mixing them in the usual manner, and allowing



them to cool ; you have then a substance which is not  
has about the same melting-point as lard. That cerate  
tion or removal of paraffin. You have a substance  
absorbed, and, on the whole, a substance which I think  
and better than lard is, as usually obtained. Perhaps  
fect substitute in all cases, but by using such a mixture  
sary to make it up and keep it on hand for a great  
could be made from time to time. I have made sim-  
ture, which might be called oleo-paraffin, as being  
paraffin, or any other name you choose to call it, as  
much of a practical judge myself) it is handsomer  
cerate made with the ordinary lard we frequently get

Mr. Babcock was invited to furnish a paper  
at the next Annual Meeting.

Mr. Bullock, in behalf of the Committee  
nounced that credentials had been received  
A. E. Ebert, E. H. Sargent, Geo. Buck, Jos.  
C. G. Wheeler as delegates from the Chicago  
macy to this meeting. On motion the  
were admitted as delegates.

Mr. Lemberger read a volunteer paper on  
with Paraffin Oil (see page 627), and exhibited  
of specimens, consisting of the crude and  
and various ointments and cerates made with  
paper was ordered to take the usual course

Mr. T. Roberts Baker, on behalf of the  
Richmond Pharmaceutical Association, read  
the minutes of that body, together with a  
follows :

#### EXTRACT FROM THE MINUTES OF THE RICHMOND CEUTICAL ASSOCIATION, NOVEMBER

A report from the Executive Committee being first  
Meade, chairman thereof, submitted the following as  
ecutive Committee in reference to a series of resolutions  
Richmond Academy of Medicine, offered by the Execu-  
April meeting, and by resolution referred back to the  
action and report:

WHEREAS, The practice of medicine and pharmacy are  
another, that it behooves the physician and pharmacist  
and to endeavor by conference and mutual enlightenment  
strict conformity to the standards of their calling: In the

Pharmaceutical Association would urgently invite the attention of the Richmond Academy of Medicine, and through it the practitioners of the city generally, to the following suggestions in regard to writing prescriptions, for it is within the knowledge of members of both societies, that each are liable to errors in writing and dispensing prescriptions, and to guard against these is the object of this communication.

*First.* We would urge the great importance of writing in a legible hand, and never to erase a word or quantity, and rewrite over it. Always to use the technical language and abbreviations of the Pharmacopœia and United States Dispensatory, and to write directions for use and dose on every prescription, and state whether for adult or infant, as a guide to the dispenser in case of error in quantity of any active ingredient.

*Secondly.* We suggest that when an unusual dose or quantity of an active and potent medicine is prescribed, such as strychnia, opium, morphia, belladonna, digitalis, etc., that the prescriber shall affix opposite a caution mark or sign, to inform the dispenser that he is aware that the dose is unusual, but required in the case. In some portions of Europe such a regulation is a law of the state. In Germany the caution mark is an exclamation point in brackets [!], and is placed on the right hand side of the prescription, in a line immediately opposite the ingredient in question. We propose that the mark shall be placed on the left hand side, and that it shall be the letters "Q. R.—" (*quantum rectum*), with a dash or line connecting it with, or nearly so, the ingredient to which attention is called, for example:

R. Quiniæ sulphat.,	.	.	.	.	.	3ss.
Ferri sulph. exsicc.,	.	.	.	.	.	gr. xxiv.
q. r.—Strychniæ sulph.,	.	.	.	.	.	gr. iij.
M. ft. pil No. xxiv.						

Sig. One three times a day.

R. q. r.—Tinct. digitalis,	
Tinct. valer. am.,	aa f3j.
M.	

Sig. Dose, teaspoonful every three hours.

These examples indicate very unusual doses of strychnia and digitalis. The careful and educated dispenser would of course hesitate to put either of them up until he could see the writer, and ascertain if the quantities were correct. To do so he must delay the patient by some plausible excuse. If the caution mark were affixed, all necessity for delay or hesitation would be removed, and the apothecary would be relieved of responsibility, as it is an evidence that the physician has reviewed his prescription, and is aware that he is giving an unusual dose.

We would also suggest the necessity for more care in prescribing the tinctures of aconite, three of which are officinal, for, as aconite is a most violent poison, the dispenser is not authorized to supply for "tinct. aconiti" anything but the tincture of the leaves. These tinctures vary largely in strength; and the compilers of the Dispensatory call particular attention to this fact, and the necessity for caution in dispensing and prescribing them. To obviate

mistakes, the physician should always properly designate the one he wants, thus :

Tincturæ aconiti, . . . . .	"Fol."
Tincturæ aconiti, . . . . .	"Rad."
Tincturæ aconiti, . . . . .	"Fleming's."

In prescribing "ferri sulphas," the apothecary is often obliged to infer that the physician means "exsiccata," although he does not so write. The dried sulphate is the only kind suitable for pills, and only it should be used ; but as three grains of the dried is equivalent to five grains of the crystals, the apothecary should not be forced to infer anything but what is written for.

We further suggest that the physician should never write any of the following or similar prescriptions without accompanying them with some written direction or explanatory note, as to the use intended to be made of them, so that the dispenser may not be left in doubt :

R. Plumbi acetat., . . . . . 3j.	R. Chloral. hydrat., . . . . . 3ij.
R. Morphisæ sulph., . . . . . gr. v.	R. Opii pulvis, . . . . . 3j.
R. Hydrarg. chlor. corros., gr. v.	R. Tinct. digitalis, . . . . . 3j.

All of these, and many others of like import, we could refer to on the files of apothecaries, are dangerous in the hands of the inexperienced and ignorant, and it would take but little time or trouble to designate in some way the use intended. It requires discretion, judgment, and prudence in manner and action, on the part of the apothecary, to so demean himself as to avert suspicion from himself, and to avoid casting injurious reflections on the physician, when he sees or thinks he sees an error in a prescription, or is doubtful about the propriety of dispensing "five grains of morphia" in a single package upon a prescription handed in by a little child or ignorant servant, perhaps, and we respectfully urge that the practitioners of medicine should give serious attention to these important suggestions.

#### EXTRACT FROM THE MINUTES OF THE RICHMOND PHARMACEUTICAL ASSOCIATION, FEBRUARY 9TH, 1875.

The conference committee, composed of three members each from the Richmond Academy of Medicine and the Richmond Pharmaceutical Association, held a meeting at the office of Dr. R. T. Coleman, Tuesday evening, 19th January, 1875, to consider the "suggestions" of the Richmond Pharmaceutical Association as to the writing of prescriptions, a caution mark when *more* than the usual dose of a potent medicine is prescribed, and "to further perfect the carrying out of the suggestions."

The committee unanimously approve the suggestions, and recommend their observance by the medical profession as our sure means of preventing errors in compounding and dispensing prescriptions.

The caution mark proposed by the Richmond Pharmaceutical Association, Q. R.— (*quantum rectum*), they discarded, and recommended P. C. (*præter consuetudinem*), as less liable to objection. This mark, like the former, it is proposed, shall be placed on the *left* side of the prescription, and immediately

*in line* with the ingredient prescribed in *excess* of the usual dose, when it is a potent one, such as strychnia, prussic acid, morphia, digitalis, aconite, etc.

The committee also discussed the evil consequent upon the frequent unauthorized *renewing* of prescriptions composed in whole or in part of opium, chloral, and other powerful remedies liable to be abused; and therefore recommend that physicians be requested to write "*not renewable*" on any prescription which they do not desire to be renewed, and the apothecaries are requested not to renew prescriptions so designated, except upon the written or verbal authority of the physician in attendance.

In this connection the committee had under consideration the subject of the growing and fascinating habit of the use of opium, morphia, and chloral, and the terrible effects on its devotees, and therefore do earnestly urge upon the members of both societies to use every means in their power to stop the sale of these drugs, except upon competent medical authority, and that the Richmond Academy of Medicine be requested to memorialize the legislature to pass a law to effect this object.

It was also resolved that the Richmond Academy of Medicine and the Richmond Pharmaceutical Association request the national associations of their respective professions to take action, in view of the fact that the symbols representing the drachm and the ounce are frequently and sometimes fatally confounded, because there is so slight a difference in their appearance; that we recommend the Richmond Academy of Medicine and the Richmond Pharmaceutical Association, and propose that they shall do the same to the National Association of Medicine and Pharmacy, to lay aside the use of the  $\text{z}$  mark, and to substitute the Greek delta  $\Delta$ , the first letter in  $\Delta\mu\chi\mu\sigma$ , which is easily made, and cannot be mistaken.

We also hold that the apothecary is not authorized to reveal to the patient the components of a physician's prescription, when such prescription is written in technical language.

RICHMOND PHARMACEUTICAL ASSOCIATION,

RICHMOND, VA., August, 1875.

In presenting for the consideration of the American Pharmaceutical Association the "suggestions and recommendations" of the Richmond Pharmaceutical Association, as to a "caution mark," etc., we are instructed to offer a fuller explanation of what we desire to see carried out. We do this because there has been a considerable amount of discussion in the journals in regard to them, and because in several instances they have been published in such a mutilated form as to obscure their meaning, and detract from their merit. If the *whole paper* be carefully perused, we think it will be seen that we have embodied in it nearly *all the safeguards* which can ever be practically enforced, and we would urge, therefore, that its "suggestions" be authoritatively promulgated by this Association for adoption by all pharmacists in accord with it. You will notice that our "*first*" suggestion is, of itself, nearly equivalent to a caution mark, if the physician will write at the *top* of all prescriptions "for adult," or "infant," as the case may be, and at the *bottom give directions* as to "*dose*" or "*use*," whether the prescription be for " $\text{zj}$  acetate lead," or one dozen compound pills or powders.

No careful and educated pharmacist would, in such a case, be liable to dispense an unusual dose of a potent drug.

The "caution mark," P. C. (*præter consuetudinem*), on the *left side* of the recipe, and *connected* by a dash — *with the ingredient in excess*, gives an additional safeguard, if the physician has also stated that the recipe is for "adult" or "infant," and written his directions as to the dose at the foot of the recipe.

In recommending the use of the caution mark, we consider that it is vitally important that *it should be connected* by the dash — *with the ingredient* in question, as without this *connecting dash* cases *might arise* in bad chirography, and several potent ingredients in the same recipe, where there might be doubt as to *which of two* ingredients was intended.

We think the "caution mark" should be on the *left*, because nearly all doctors run out the quantities prescribed to the margin, or nearly so, of the *right side* of the prescription-paper, and there would be no room for the "mark," nor would it strike the eye so quickly as if written on the *left*, and we believe that our mark has advantages over all "asterisks" or "exclamation points," whether placed on the right or left, because asterisks or points may be confounded with blots or flourishes, especially where we have to encounter so much bad handwriting as is too common with our medical men.

It has been objected that there is great diversity of authorities as to "unusual doses," and the dispenser sets himself up as a judge of what is an unusual dose if we adopt the caution mark, and therefore the mark is objectionable until we have an *authorized standard posological table*. We do not agree to this objection. There is an *approximate standard* for unusual doses, the United States Dispensatory, and the accepted and concurrent opinion of all well-versed physicians and dispensing pharmacists, and these must be our *guides* and *guards*. No system of caution marks is infallible, and to any that may be devised, now or hereafter, objections will be made, but we feel that it is the duty of our profession to adopt some means, either this or another, that will insure protection to our customers, ourselves, and the medical fraternity.

The remaining portions of our paper need no further explanation, but we commend a careful consideration of the *whole* to the Association, and request that these papers be referred to a select committee of three, who shall report to this present meeting.

T. ROBERTS BAKER,  
Chairman of Delegation.

Mr. Wm. McIntyre read the following extract from the minutes of the Philadelphia College of Pharmacy, relating to the same subject.

The following is an extract from the minutes of the meeting of the Philadelphia College of Pharmacy, held June 28th, 1875:

A communication was received from William McIntyre, Registrar, calling the attention of the College to a paper by James Kemble, Ph.G., entitled "Unusual Doses and their Correctness when ordered in Prescriptions," said

communication of Mr. Kemble having been read before the eighth regular pharmaceutical meeting, and after discussion by that body was referred to the College.

At the request of the meeting, the paper was read, and a short discussion ensued, when, on motion of Prof. Remington, amended by Prof. Maisch, the subject was referred to the delegates to the American Pharmaceutical Association, with instructions to bring the matter before that body, with a view of securing uniformity of action in the United States, with the information that this College recommends a suitable mark to designate unusual doses.

The motion was adopted.

Respectfully,

WILLIAM J. JENKS,  
Secretary.

To the Delegates to the American Pharmaceutical Association.

Both papers were ordered to be referred to a special committee, after which the Association adjourned to Thursday morning at 9 o'clock.

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*Fourth Session.—Thursday Morning, September 9th.*

In the absence of the President and First Vice-President, the Second Vice-President, T. R. Baker, occupied the chair at the opening of the session. The Secretary read the minutes of the third session, which were, on motion, approved.

Mr. A. W. Miller exhibited a specimen of ground rice, which, it is stated, is used to adulterate granulated sugar to the extent of 25 per cent., such sugar being disposed of to confectioners in the West and South, who are led to believe it to be purer than ordinary sugar.

The reading of scientific papers being resumed, the Secretary read an essay on Drug Mills (see page 575), by Andrew Blair, in answer to Query 1, and exhibited a series of samples of ground drugs prepared by Mr. Blair with the different mills under consideration.

MR. EBERLE.—At the meeting at Cleveland, I called attention to a small mill made by Swift. After that meeting, I had a number of communications asking me to furnish them. I supposed from the facility with which they were obtained originally that they were always in the market, and Swift was

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issuing them from his establishment; but after sending a number of mills away found I had exhausted the stock. They were furnished by Landreth, in Philadelphia, and he said they came from the old stock of a store they had closed at St. Louis. I make this public statement for the benefit of the members who might still be inclined to have the mill, if possible. It is unfortunate, I think, that the stock has run out, and that Swift is not now making them, because all who used them found they were very serviceable. The mill was adapted to the uses specified and of great value in the store. They could be procured at Landreth's seed store, but are not now made.

An essay on Mezquite Gum (see page 647), in answer to Query 16, was read by the author, A. W. Miller, who also exhibited specimens of the leaves, fruit, and gum of the tree, obtained from New Mexico. The paper was accepted and referred.

The Business Committee presented the following resolution, which was carried.

*Resolved*, That the Executive Committee with the Permanent Secretary, be authorized to have a neat and appropriate badge of membership prepared for the Association. Said badge to be struck up in *metal* and to remain the permanent badge of the Association.

MR. BIDWELL.—I would like to make an inquiry of the Secretary, or anybody else skilled in pharmacy. It was stated that mezquite mucilage contains tannin, and is compatible with solutions of lead. Are not those two statements inconsistent? If it contained tannin, would it not precipitate lead salts?

THE SECRETARY.—I am not able to answer that, but it is possible that even in the presence of a small quantity of tannin a precipitate might, perhaps, not occur; that the lead salt and resulting tannate might be held in solution by the gum, if this is not precipitated by the lead salt. We must also remember that there are a large number of substances called tannins, and that they are not all alike, nor like gallotannic acid. Such questions can be decided by experiment only.

The reporter on the progress of pharmacy presented his annual report, explained its arrangement, and read the introductory chapter. It was accepted and referred for publication (see pages 25 to 485).

Dr. Pile read the following report of the Committee on Maximum Doses:

The committee appointed to report a list of maximum doses of potent remedies, beg to state that in view of the wide difference in the statements of different authorities in regard to the quantities of potent remedies which could safely be administered, came to the conclusion that an arbitrary list of maxi-



mum doses made out from such conflicting authorities would be of no practical utility; and your committee therefore suggest *that a committee be appointed to confer with the National Medical Association on the subject of maximum doses, as well as the proper signs to be adopted to designate the correctness of larger doses when intended by the physician*, as an understanding might thus be arrived at, which would prove of practical value to the physician as well as the pharmacist.

WILLIAM SAUNDERS,  
W. H. PILE,  
LOUIS DOHME.

DR. PILE.—Such a list would take away from the apothecary a great deal of anxiety. Whether we would have any authority to state the amount of the dose, and whether the physicians would then agree to the subject, we have doubts, but suggest that we should meet with the physicians themselves, and get them to agree to make out a list, as the only thing practicable.

THE SECRETARY.—I hope this report will not be passed lightly over. I think it is an important one, particularly if taken in connection with the communication received from the Delegation of the Richmond Pharmaceutical Association. I think this Association ought to take some action in the matter, and discuss it, and perhaps different views might come up. So far as my personal views are concerned, I think that the course proposed by the Committee on Maximum Doses is the only correct one. In European pharmacopœias we find tables containing the maximum doses, as well as the doses which may safely be given during twenty-four hours. Our Pharmacopœia does not contain anything of the sort. It does not even indicate the ordinary doses nor the highest dose that is allowable. On these points we gain no information whatever from the Pharmacopœia. It may be said that the United States Dispensatory gives such information, but the information given there is likewise very incomplete, and without the proper authority. In many instances you will find the dose given in the United States Dispensatory as ranging between certain limits more or less widely apart. There ought to be some fixed limit for the guidance of the pharmacist as well as the physician. In order to know what is an unusual dose, we ought to know what is the maximum dose that is allowable under ordinary circumstances. We all know, or are expected to know, the ordinary dose, and even the highest allowable dose of the potent medicines, but the notions are certainly very different in that regard. While some may, for instance, consider half a grain of morphia as a full dose, others will give a grain, and consider that only a full dose. Similar instances might be mentioned in a great many cases. I hope that the suggestion made here by the committee will be taken in hand by the Business Committee, and brought forward as a regular motion.

DR. PILE.—We make a suggestion that a committee be appointed to confer with the National Medical Society, and, as they will all meet in Philadelphia next year, it is hoped we shall there have a fuller and more general communication with each other. The committee might be appointed now.

THE SECRETARY.—Then it is not merely a suggestion, but a motion that the committee desires to make.



The report was accepted, and the resolution adopted, directing the appointment of a committee of three to confer with the American Medical Association on the subject of unusual doses.

Mr. Saunders read a paper by George W. Sloan, on Pharmaceutical Preparations of Phosphorus (see p. 616), and exhibited samples of the preparations described. The essay was in answer to Query 7, and a paper on an allied subject, written by Mr. W. H. Walling, who is not a member of the Association, having been presented to the Committee on Papers, the Association permitted it to be read. It treats of Phosphorus Pills (see p. 618), and was accompanied by specimens of the pills.

MR. CLOSE.—A similar process was published by Mr. Walling in the American Journal of Pharmacy, which I endeavored to follow, but was not successful. Probably on account of the high temperature, which was about 80 at the time, the mass would take fire. He says nothing about the temperature. It might be 60 or 50.

MR. PILE.—I have had some experience in phosphoretted resin, and found some difficulty in making it of a stronger proportion than 4 per cent. of phosphorus. These gentlemen seem to have succeeded in making it 10 per cent. This will introduce a new preparation. The phosphoretted resin which has been extensively used has a strength of 4 per cent. In making an emulsion with that preparation, I have found it an easy way to rub it with oil of almonds, when the resin is easily taken up, and the emulsion can then be readily made with gum arabic or other emulsifier. The oil dissolves the resin quite readily. The objection is, it is not very palatable. The resin has an unpleasant taste when made into an emulsion, and I think the better plan would be to make a solution of phosphorus in oil, as recommended by Mr. Méhu, in the Journal of Pharmacy, last month. That process consists in heating the oil to a high temperature, and driving off all the moisture; the phosphoretted oil remains permanent, and will not change. It may then be made into an emulsion, and the unpleasant taste of the resin will be avoided.

THE SECRETARY.—It is, perhaps, known that Mr. Méhu objects to the phosphorated resin on another ground, namely, that the phosphorus is not really dissolved in resin. That is to say, it dissolves while the resin is hot, but on cooling the phosphorus is separated again in minute particles. I think that is the experience of others. If I recollect rightly Mr. Méhu states that not more than 1 per cent. of phosphorus can be dissolved in fixed oils. That probably is the limit of the solubility in cacao butter or in resin. I believe Mr. McIntyre has had some experience on that subject.

MR. MCINTYRE.—My experience has been with the use of cacao butter alone. It occurred to me when these formulas were first presented that twenty-

five grains of phosphorus administered in such a small proportion of vehicle (800 grains of cacao butter and 200 grains of soap, as was first proposed by Mr. Walling) was not safe, and upon inquiry of physicians found they had met with some trouble when they had omitted to caution the patients to take the pills *after* eating. Therefore I prefer to use a larger proportion of cacao butter.

**THE SECRETARY.**—It will be observed that Mr. Walling suggests 8 per cent., and I suppose that is where the difficulty of Mr. Close arose from working with a larger percentage of phosphorus than is now recommended by Mr. Walling. In stating 8 per cent. I refer to the solution in cacao butter.

**MR. MCINTYRE.**—In making pills, during the warm weather in summer, I have had to use ice to make them retain their shape.

**MR. SAUNDERS.**—In my experience with phosphorated resin a difficulty arose which I have not been able to account for. After preparing it, it was put away in bottles, and kept for some time; on taking it out and powdering it, for the purpose of dispensing, I could not perceive any odor of phosphorus. I suppose it must have been kept a year before I observed this entire want of odor of phosphorus; rubbing it up briskly in a mortar did not develop it at all.

**MR. WELLCOME.**—I have noticed the same thing in only three months. I tried the suggestion of Mr. Maisch, and have kept water over the phosphoretted resin, and after a time it developed a very disagreeable odor of phosphoretted hydrogen; but after pouring off the water, and removing the top portion of resin, underneath it retained its phosphorus strength.

**MR. MATTISON.**—I had a conversation with Mr. Sloan, in Indianapolis, on phosphoretted resin, and he took samples that had been made several months, rubbed them in a mortar, and on taking them into a dark room we could not discover any odor or phosphorescence, while that of the strength of 10 per cent. emitted a strong odor. He said the phosphoretted resin of 8 or 4 per cent. emitted light and odor when it was first prepared, but it seemed to change.

The papers of Messrs. Sloan and Walling were accepted and referred.

The Committee on the President's Address reported, through its chairman, Mr. Balluff, as follows:

#### REPORT OF THE COMMITTEE ON THE PRESIDENT'S ADDRESS.

Your committee respectfully report that they have examined the address of the President, and after carefully considering the suggestions therein contained they offer the following for your consideration:

1st. Attention is drawn to a defect in our By-laws, Article 1, Chapter IX, which limits the President somewhat in his report, and we suggest an amendment to this article, allowing the President power to offer any suggestion to

the Association in his annual address that may advance the general welfare and work of the Association.

2d. Your committee would also recommend an amendment to the By-laws, by which the entire responsibility of the rejection of such papers as may not be deemed suitable for publication will be taken from the Executive Committee, and referred to a committee consisting of the Permanent Secretary, and chairmen of the Executive Committee and Committee on Papers and Queries.

3d. The suggestions relative to the organization of the Committee on the Drug Market, to which is assigned the duty to report on adulterations and sophistications, impress your committee favorably, and we believe if such an arrangement can be effected more satisfactory and interesting papers on these important subjects will be received; and we suggest an amendment to the By-laws covering this point.

Respectfully submitted,

PAUL BALLUFF, *Chairman*,  
JOS. L. LEMBERGER,  
N. HYNSON JENNINGS,  
Committee on President's Address.

The report was, on motion, accepted, and the propositions contained therein were ordered to be taken up seriatim. Since they involve alterations of the by-laws, they have to lie over to another session under the rules.

The same committee, to whom had also been referred the Secretary's report, presented the following:

#### REPORT OF THE COMMITTEE ON THE PERMANENT SECRETARY'S REPORT.

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION:

Your committee have examined the various suggestions offered by the Permanent Secretary, and respectfully report, that they impress us as being entirely in place, referring as they do to the perfecting of arrangements for the next meeting of this Association during the Centennial Anniversary in Philadelphia.

His suggestions are as follows, viz.:

1. "That this Association communicate directly with the various pharmaceutical societies of foreign countries, and invite their members to meet this Association at its next meeting in Philadelphia."

2. "That a Committee of Arrangements, of which the Local Secretary for the ensuing year should be a member, be appointed, to which the committee report rendered in 1873, be referred with power to act."

3. "That there be no special exhibition in connection with the Twenty-fourth Annual Meeting of this Association, except so far as may be necessary

for specimens illustrating reports on queries and papers offered to the Association."

4. "That this Association recommend the appointing of suitable committees on the part of the various pharmaceutical associations of the United States and Canada, for the purpose of giving information to pharmacists of foreign countries who may desire to visit their cities during the Centennial celebration in 1876."

Respectfully submitted,

PAUL BALLUFF, *Chairman,*

JOS. L. LEMBERGER,

N. HYNSON JENNINGS,

Committee on Permanent Secretary's Report.

On motion of Mr. Eberle, the report was accepted, and the recommendations contained therein were adopted.

Mr. Dohme, in answer to Query 37, and in continuation of his researches published last year, read a paper on Phosphoric Acid, which was accepted and referred for publication (see page 662).

Mr. Markoe read a volunteer paper on a New Method of preparing Phosphoric Acid (see page 677), which was likewise accepted and referred.

MR. MARKOE.—In order to show how simple the apparatus is, and how easy it is to perform the process, I have brought this morning the result of two experiments that have been made within a few days.

In this half gallon flask I started the experiment at 8 o'clock in the evening. The proportions used were two ounces of phosphorus, and twelve of concentrated nitric acid, and about one ounce of twenty per cent. solution of hydrobromic acid (that being more convenient to add than bromine), and ten grains of iodine. It is exceedingly interesting to see how readily the reaction starts. You add the iodine or bromine, or both together. It does not make any difference whether the phosphorus is melted or not. The reaction goes on quite as well as it will with heat, only with less violence. The nitric acid decomposes. The hydrobromic acid formed by the action of the water on the pentabromide of phosphorus setting free the bromine, which again combines with the phosphorus to form  $PBr_5$ ; and so the play of reactions goes on till all the phosphorus has been dissolved.

The flask should be placed in a convenient earthenware pan, and it is better to use a broad pan, so you can get a larger body of water to modify the temperature. If a large funnel is used, there is scarcely any escape of the gas between the funnel and neck of the flask. If the reaction be so modified that the neck of the flask and the two funnels are kept cool, there will be little or no loss of the bromine or nitric acid, there being a constant trickling down of the nitric acid. The probability is, there is really an economy of nitric acid, because the nitric oxide,  $NO$ , coming in contact with air, is transformed into

nitric peroxide,  $\text{NO}_2$ , which is decomposed back into nitric acid, which goes back into the flasks and nitric oxide, which again goes through the reactions mentioned. I have got along with using much less than six parts of nitric acid to one part of phosphorus. Five parts will do very well if the process is managed carefully. There is no loss, but a little gain of nitric acid.

This apparatus was put into water and let alone until the next morning, when the phosphorus was entirely dissolved, and the flask and contents here shown are exactly as I took it out of the fume-closet; so you have two ounces of phosphorus which have been transformed into phosphoric acid, and there remains here nothing but the excess of nitric acid and the remains of the iodine and bromine which were used at the beginning of the process. I wish the members to notice that in this experiment concentrated nitric acid was used without any water. You see what advantage that has in doing away with the necessity of a long evaporation necessary to drive off the water in the process.

This form of apparatus is within the command of any pharmacist, and after one or two trials there is no excuse for failure. At the same time that this experiment was made, another one was started under precisely the same conditions, except the nitric acid was diluted with an equal weight of water. The acid, instead of being of a specific gravity of 142, was about 120. The reactions under those circumstances were somewhat slower, but will go on perfectly well. It is only a question of time, and, as the process does not need watching, the apparatus can be arranged and let alone, and something else may be attended to. The process works itself, and does not make any special demands on the time of the operator. For general use I should recommend the employment of this weaker acid, especially if the process is to be intrusted to assistants not skilful in chemical manipulation.

MR. BULLOCK.—You found no iodine and bromine compounds at the completion of the process?

MR. MARKOE.—There being an excess of nitric acid at the completion of the process, it is impossible that there should be anything more than free bromine and iodine, for hydrobromic and hydroiodic acids are always decomposed by nitric acid, and of course will be driven off by the heat needed to get rid of the nitric acid.

MR. BULLOCK.—Has it been tested for bromine?

MR. MARKOE.—The process would be its own test, because one of the readiest ways in which we can determine the presence of bromine is to test it with nitric acid, when the bromine would be liberated, and would become manifested by its odor and color. If strong nitric acid is used, the process requires care in order to keep the temperature from getting too high; but the free use of ice will check the reaction, but will not entirely stop it, because nitric acid will slowly decompose hydrobromic acid in the cold, and the free bromine will react on phosphorus at all temperatures.

If the nitric acid is diluted with an equal weight of water, the mere setting of the apparatus in cold water at the beginning of the process is generally all the precaution needed. The reaction goes on very quietly till all the phosphorus is dissolved. The process is hastened by removing the water during

the last part of the process, for the reaction will naturally become less and less rapid as the nitric acid gets used up.

MR. DOHME.—Have experiments been made as to the presence of arsenic?

MR. MARKOE.—I have repeatedly found arsenic in phosphorus. I do not know whether these samples have it or not. I propose to test it before it is sold. I shall be glad to let Mr. Dohme have sufficient of these samples to report upon.

MR. PILE.—Do you allow the reaction to go on before you put the flask in water?

MR. MARKOE.—You get it started to a sufficient extent to melt the phosphorus, then the heat, in spite of the water, seems to be sufficient. The rapidity of the reaction can be controlled in several ways, by keeping the temperature down, by using weaker nitric acid, or by using less bromine and iodine. In these two experiments, I think I used about an ounce of twenty per cent. of hydrobromic acid, and ten grains of iodine.

MR. PILE.—The foreign imported phosphorus does generally contain arsenic. I think that made in this country does not.

MR. MARKOE.—The phosphorus I have used is American phosphorus. I fancy the presence of arsenic may be explained from the fact that within a few years all the phosphorus used in this country has come from England, and it is a fact that all the crude chemicals involving the use of sulphuric acid, are made by the use of the ordinary English sulphuric acid, which contains arsenic. American sulphuric acid is made from Sicily sulphur, and does not contain arsenic.

MR. BULLOCK.—I think Mr. Markoe is under a mistake in regard to the American sulphuric acid. Nearly all the sulphuric acid made will contain a trace of arsenic.

During the celebrated Wharton trial, I had a request to send on muriatic acid free from arsenic. Every sample that I found contained arsenic. I found it all came from the sulphuric acid, and one of our manufacturers endeavored to make it free from arsenic. Thinking it might come from the glazing of the vessels used as condensers, they made use of glass vessels, and still the acid contained traces of arsenic, and the conclusion arrived at was, that the arsenic was so volatile that the heat was sufficient to distil it over, and to thus contaminate the acid.

In regard to Mr. Markoe's process of making phosphoric acid, it is a reversion of the process which will be found in the books, and which has been made use of by a number of us for making iodides and bromides by the use of iodine or bromine and phosphorus, and I am very glad to see he has turned the thing around, and put it to a practical application.

MR. MARKOE.—I wish to make a farther hint in regard to the making of phosphoric acid by the direct process we have all heretofore employed. I have been obliged to devise a simpler and stronger form of apparatus than glass flasks. Practically, I rarely work with less than two or three pounds of phosphorus at one operation, and I long ago graduated out of glass flasks after finding to my great cost that they did not pay. I hit upon the idea that an

ordinary stone jug would be as good as anything else, and can be used without any trouble whatever. I want to call attention to a form of apparatus I found in one of the crockery ware stores, what are known as stoneware churns, being in fact nothing more than open-mouthed stone jars having a shelf upon the inner part, upon which this perforated cover comes. It will occur to every member that such a form of apparatus will be very useful, and can be made tight by luting it. This gives just the thing we want, and is exceedingly cheap. One of the capacity of six gallons can be bought for \$1.75, and there are numberless applications to which it can be put. To show the practical application of it in the manufacture of phosphoric acid, it is easy to take two or three pounds of phosphorus in a jar of this kind with the proper amount of nitric acid. I found that nitric acid of a specific gravity of 1.20 is about as strong as can be used safely. By having the apparatus arranged so you can place it in cold water and check the reaction, it is infinitely better than the suggestion made of adding water to the contents of the flask to check the reaction. If you watch it, and remove the whole apparatus bodily, or what is better, set it into a tub into which you can pour the water when it is required, if worst comes to worst. There is one thing I am in the habit of employing, and that may be novel to some; that is, the exceedingly useful purpose that a supply of ice will serve under these circumstances. If you find that the reaction is getting the best of you, and you cannot check it by setting the jar in water, you can remove the cover and throw into the body of the jar pieces of ice, and with stoneware jars there is no danger in doing it. With glass apparatus that would, of course, be fatal in a majority of cases. These churns are made of all sizes, from two quarts up to six gallons, and to order could be made larger.

MR. PILE.—That would be applicable to the preparation of bromide of ammonium in the way I proposed last year. I found there some difficulty in checking the reaction. It became so hot that it got the upper hand of me, and we all had to run. By this method of putting it in water, and keeping the temperature down, there is no danger at all.

Another volunteer paper on the subject of Phosphoric Acid, written by Joseph P. Remington, was read and referred (see page 670).

MR. BULLOCK.—The essays which have been read on this subject are very interesting, and have rendered the whole subject phosphorescent. The last paper read, it appears to me, gives us the information which has been the source of a great deal of trouble to us, which can be summed up in a few words. In the presence of a soda salt glacial phosphoric acid cannot readily be completely converted into tribasic acid.

MR. DOHME.—I made a trial of taking orthophosphoric acid and adding pyrophosphate of sodium to it, and then heating it to 280° or 300° for some time, without being able to make the conversion of pyrophosphoric acid into tribasic acid. The pure glacial acid was found to be a semi-solid mass, but when this was again dissolved in water, and heated for a few moments up to



280°, I found it converted into tribasic acid, showing that the decomposition of the chloride of iron was due to the presence of pyrophosphate of sodium in the commercial glacial acid.

MR. EBERLE.—I recollect, in an operation in my shop, that when about to give up or reject the process, my assistant added some nitric acid, and continued the boiling, testing with tincture of chloride of iron, and finally he overcame the difficulty, and obtained a solution that did not precipitate chloride of iron.

MR. DOHME.—I think it was due to the presence of nitric acid.

MR. EBERLE.—No; he got rid of that. He was very particular about that.

The Secretary moved that a committee of three be appointed to consider and report upon the time of the next meeting, which it had been decided in 1871 (see Proceedings for that year, p. 76), is to take place in Philadelphia. The motion was carried.

A paper on Hydrobromic Acid was read, and specimens of the preparation exhibited by Mr. Markoe. The paper was accepted and referred (see page 686).

Mr. T. R. Baker read a paper on the Antiseptic Properties of Chloral Hydrate, in answer to Query 10, which was accepted and referred (see page 710).

The President appointed the following committee to confer with the American Medical Association in regard to a table of maximum doses, and a sign to indicate unusual doses: Dr. W. H. Pile, of Philadelphia; Louis Dohme, of Baltimore; and Charles L. Eberle, of Philadelphia.

The Association then adjourned until three o'clock in the afternoon.

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*Fifth Session.—Thursday Afternoon, September 9th.*

The meeting was called to order by President Markoe. The Secretary read the minutes of the preceding session, which were approved.

The Chair appointed the following committee to report on the time of next annual meeting, W. J. M. Gordon, Cincinnati; Charles Bullock, Philadelphia; and Charles H. Darymple, Morristown, N. J.



The following report of the Auditing Committee was read by the Secretary:

REPORT OF AUDITING COMMITTEE.

The undersigned, appointed to audit the accounts of Charles A. Tufts, Treasurer of the Association, report that they have examined the books, compared the payments with the vouchers, and find them correct, there being a balance on hand in favor of the Association of \$1174.09.

The committee have been equally impressed with the neatness and business-like style in keeping the accounts as their predecessors have been, and congratulate the members in having such an officer to take charge of their finances.

JAMES T. SHINN,  
W. J. M. GORDON.

Boston, September 9th, 1875.

On motion, the report was accepted and the committee discharged.

The following queries, answers to which were not ready, were continued to the acceptors for another year.

No. 11. On Adulterations in Oleum Theobromæ, to G. Ramsperger.

No. 20. On the Value of Pancreatic Preparations, to W. S. Thompson.

No. 30. On a Process for Apomorphia, to Charles Rice.

No. 32. On the Vesicating Insects of America; and No. 33. On the Insect Attacking and Damaging Rhubarb, to William Saunders.

No. 34. On the Arrangement of the Dispensing Department, to J. F. Hancock.

No. 35. On the Crystalline Forms of Santonin, to O. Eberbach.

No. 45. On the Preparation of Scammony Resin, to G. F. H. Markoe.

No. 52. On Concentrated Preparations from Aromatic Drugs, to G. F. H. Markoe.

No. 53. On the Arrangement of Store-room and Cellar, to J. F. Hancock.

Mr. Mattison read a paper on Suppository Moulds (see page 625), in answer to Query 13, which was ordered to take the usual course.

The Committee on Papers brought forward the paper on

**Tasteless Iron Preparations**, written by E. Rutter, of New York, who is not a member; on motion, the paper was read, and afterwards, it was referred (see pages 691 and 797).

**MR. CREUSE.**—Mr. Rutter's paper is a slightly modified repetition of that which he has already sent to English and American periodicals for publication on the same subject. The present communication can be met with the same answer which others than myself have already made to the previous papers. They are, that a chemical equation is not sufficient to prove in what particular manner two or more salts are combined in a mixture, and that the use of different solvents as well as dialysis, can of themselves influence enough chemical affinities to cause a different arrangement of the bases and acids. A change of temperature is, indeed, often all that is necessary to effect such a mutation as may be proved by the familiar instance of a solution of chloride of magnesium and sulphate of sodium, which by evaporation produces the above-named salts, while freezing will cause in it the formation of sulphate of magnesium and chloride of sodium. It is well known also that the medium in which the reaction takes place has the greatest influence on the product of a double decomposition.

Admitting for argument's sake, the correctness of Mr. Rutter's experiments and chemical equations, although the latter might be controverted, it appears from his own showing that it is not and cannot be ordinary potassium iodide which he obtains by dialysis, for the solution of that salt can usually be evaporated without change, while Mr. R. states that the dialyzed solution gave crystals "much colored from iodine." This contamination is attributed by Mr. Rutter to continued exposure, but it is more probably due to the destruction of the combination by the dialysis. I will mention also a few facts which are in contradiction with the theory of a simple mixture of two salts. They are the following: When ferric orthophosphate is dissolved in an alkaline citrate, the liquid has an appearance and a color differing from those of the official pyrophosphate. The soluble phosphate of iron, as this kind of combination is often called for shortness, has in solution an olive-green hue, more or less deep and remarkable dichroic properties. The liquid is green by transmitted, and red by reflected light. The pure pyrophosphate, on the contrary, has a clear apple-green color, and its solutions are free from any red hue when they are examined by reflected light. I have had frequent occasion to make these solutions by the fifty gallons at a time, and I never saw the test fail. More than this, one day I obtained a solution of pyrophosphate of iron possessing dichroic properties; this led to an examination of the chemicals, and the pyrophosphate of sodium used in the preparation was found to contain a certain quantity of unconverted orthophosphate. According to the theory which I combat, both solutions should be a simple mixture of the same citrate of iron with a colorless alkaline phosphate or pyrophosphate. Then, why have they a different color and different physical properties if there is no combination? I may add, that the color of all similar combinations varies according to the nature of the sesqui salt of iron used, a fact which is in direct conflict with the supposed presence of the same uncombined citrate of iron.

Some time since, a correspondent of the Druggists' Circular, relating his experience with a mixture of ammonio-citrate of iron, and iodide of potassium, made the remark that the liquid had turned from a garnet-red color to a bright-green. Such a change is, no doubt, good evidence of some modification in the chemical combination.

Again, when the tasteless tincture of muriate of iron is kept some time, a notable quantity of chloric ether is formed, as much in fact as in the officinal tincture. How can this be explained, if we accept the theory that the compound is only a mixture of chloride of sodium and citrate of iron? Chloride of sodium cannot cause the formation of chloric ether, although chloride of iron may; and how can free muriatic acid exist in the presence of neutral citrate of sodium? The formation of ether under such circumstances is, in my opinion, pretty sure proof that the iron, or at least a good part of it, still remains in the state of chloride of iron.

MR. MAISCH.—I believe the experiments which Mr. Rutter has made, prove nothing for his theory. What is fatal against his theory that the pyrophosphate of iron is simply a mixture of pyrophosphate of ammonium and citrate of iron is, that the alkaline phosphate, which he says he has obtained by dialysis, will not crystallize. In the next place, the color, I believe, is pretty good evidence that there is really some kind of a chemical combination between the salts. We may not be able to explain the exact manner in which the combination has taken place, but it seems to me it needs a great deal more and much better proof than has been furnished by Mr. Rutter to establish the correctness of his views.

The following papers, in answer to queries allotted last year, were read, accepted, and referred: No. 15, on *Spiritus Ammoniae Aromaticus*, by Wm. McIntyre (see page 606); No. 21, on Iodoform, by H. M. Wilder (see page 717); No. 24, on Chlorodyne, by J. F. Hancock (see page 610); No. 27, on Matico, by J. M. Maisch (see page 645).

The Committee on the Exhibition of Specimens, through its chairman, Joseph Roberts, presented the following preliminary report, and requested permission to write out in detail their notes on the goods exhibited after the final adjournment. The request was granted, and the preliminary report accepted.

ODD FELLOWS' HALL, BOSTON, September 9th, 1875.

TO THE OFFICERS AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Committee on Specimens beg leave to report that at every stage of progress in the performance of their duties they have received the valuable aid of the Local Secretary, S. A. D. Sheppard. We find on every hand evidences of care and time bestowed lavishly by him. The unusual size and

completeness of the Exhibition would have rendered nigh impossible an accurate and careful examination but for his assistance, and they recommend that the Association tender the Local Secretary a vote of thanks.

JOS. ROBERTS,  
P. E. DUPUY,  
E. H. DOOLITTLE,  
GEO. LEIS,  
A. S. LEE.

The resolution of thanks to the Local Secretary, S. A. D. Sheppard, proposed by the committee, was unanimously adopted.

Mr. Saunders, in requesting the continuance of Queries 32 and 33, made the following remarks:

MR. SAUNDERS.—The species of American cantharides are very abundant at times, and at other times very rare. This is one of the years in which the scarcity is general. I have written to many portions of the country where they are found commonly, and have not been able to obtain enough to make my experiments with.

In regard to the insect which attacks rhubarb root, I have reared specimens of it through different stages, and found it is not the insect I supposed it to be, namely, the moth I referred to in a previous paper, called *Tinea zææ*, so common in drug stores generally. On obtaining the insect in a perfect state it was found to be a different species, and new to me; but I was not anxious to immortalize myself by giving a name to it for fear it might be found a synonym. On this account I am not able to present a reply, and would ask that it be deferred for another year.

The following essays, in answer to queries, were read and referred: No. 38, on Pancreatin, by Emil Scheffer (see page 725); No. 39, on the Action of Nitric upon Carbolic Acid, by C. G. Wheeler (see page 700); No. 40, on Tests for the Purity of Chloral Hydrate, by Jos. Roberts (see page 707).

MR. PILE.—I would like to ask if Mr. Roberts has made any comparative experiments with the so-called crystallized chloral. I see he does not mention that which seems to be a different article from the usual commercial article made by the best manufacturers.

MR. ROBERTS.—The sample of Merck's hydrate of chloral was crystallized; that of Schering was in the usual form of flake.

The Secretary alluded to the proposed publication of the Popular Health Almanac as follows:

MR. MAISCH.—I desire to bring something to the notice of this meeting, which seems to me of considerable importance, and to deserve not only the

notice of the individual members, but also the countenance of the Association and every pharmacist in the country. We are all aware of the immense traffic in patent medicines, and we all profess to be opposed to the sale of patent medicines, and to endeavor to reduce the sale of them as much as possible. As long as patent medicines shall be called for by the public, pharmacists will be compelled to keep them, and their efforts will amount to nothing until the public has been well informed of the dangerous nature of many of these nostrums that are so frequently found in the hands of many families. Many suggestions have been made before the one made by Dr. Frederick Hoffmann, of New York, in a paper printed in the Chicago Pharmacist, which appears to be deserving of particular notice.

The suggestion was this: Reflecting upon the fact that the manufacturers of nostrums advertise their articles by means of almanacs, which they distribute freely and gratuitously through the country, it seemed to Dr. Hoffmann that by pursuing a somewhat similar course the public might be reached, and information upon sanitary subjects might thus be imparted. He threw out the idea of the publication of an almanac which might be distributed in a similar manner. This matter has since been freely discussed, and I am happy to say that arrangements have been made by Mr. Steiger, of New York, to issue what he calls a Popular Health Almanac, under the editorship of Dr. Hoffmann. It is proposed that this almanac shall contain popular essays on matters concerning the public health, etc., and give analyses of nostrums, so that people may learn of what those that have been analyzed are really composed. I do not know whether, or what action, if any, would be advisable for the Association to take, but I think the subject certainly deserves to be noticed here.

Mr. Markoe exhibited evaporating-dishes hammered out of sheets of block tin.

MR. MARKOE.—I wish to call the attention of the Association a moment to an exceedingly useful though not new form of apparatus, some forms of evaporators, which I believe are much more used in Europe than here, and that can be made very easily, and at a relatively low cost. I have here two evaporating-dishes, which can be made by any coppersmith from a piece of rolled block tin. Block tin can be obtained in a roll of any thickness desired, and can be beaten up, under the hammer, into any desired form. Evaporating and other vessels made of this material are adapted to a great variety of uses. They can be used for the evaporation of most neutral solutions, and are preferable to the merely tinned copper vessels, the tin of which is constantly wearing away, rendering the preparation liable to contamination with copper. The tin being of comparatively low melting-point, if care be not taken the impinging blaze of a Bunsen burner is likely to burn it. That is liable to take place in making syrups, where care is not taken to stir the liquor, and the sugar cakes on the bottom. It is easy to repair them with a blowpipe. The large one I have here was accidentally damaged, and in a few minutes I fused in some block tin, by means of a common blowpipe, without any difficulty at all. They have the merit of being consequently very cheap, and being worth their weight at any time. They cost about \$1

per pound, so that their cost is not much greater than that of a good Berlin porcelain dish, and they are much more useful, and less liable to injury.

The President appointed the following Committee on the Ebert Prize: Charles Bullock, Wilson H. Pile, and John M. Maisch.

Query No. 43, on the Relation of Physician and Pharmacist, was answered in an essay, by E. P. Nichols (see page 557), and Query 44, on Bromides and Hydrobromates, by Chas. Bullock (see page 703). Both papers were accepted and referred.

MR. MAISCH.—I notice that Mr. Bullock has adopted for these compounds of the alkaloids the nomenclature of bromides; I should like to ascertain whether he regards that as correct?

MR. BULLOCK.—I consider that as the alkaloids neutralize the hydrobromic acid without displacing the hydrogen, they should be called hydrobromates.

THE PRESIDENT.—The Chair would suggest that Mr. Bullock correct the names in accordance with his views, and not give the authority of the Association to the use of incorrect names.\*

The President announced having received an invitation from Prof. Sargent, of the Percy Institution of Harvard University, inviting the members to visit the botanical garden of that institution at Cambridge. The invitation was, on motion, accepted, with the thanks of the Association.

Mr. G. W. Kennedy read a paper on the Pharmaceutical Preparations of Calabar Bean, in answer to Query 47 (see page 602). It was accepted, and referred. Specimens of the various preparations were exhibited.

MR. MAISCH.—I would like to inquire whether Mr. Kennedy's calabarized gelatin contains in each piece a definite quantity of the calabar bean?

MR. KENNEDY.—It is supposed to contain about one grain of the bean, one hundred minims of the fluid extract being used to one hundred squares.

Mr. Tufts read a paper on the Preparation of Cinchona Alkaloids, by Randal Rickey, in answer to Query 49 (see page 644); and Mr. Tozzer a paper, by L. D. Drury, on Commercial Citrate of Iron and Quinia. The latter paper gave the results of assays, showing considerable deficiency of quinia in

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\* The change in the nomenclature has been made by Mr. Bullock in the paper printed on page 703.—EDITOR.

the preparation as offered by several manufacturers, whose names were given in the paper (see Minutes of sixth session).

MR. BABCOCK.—Is there any person who can inform us how many experiments were made upon which the figures given in this report were obtained?

MR. MARKOE.—Not less than three in any case.

MR. LILLARD.—I should like to ask if these samples that contained so small a proportion were marked U. S. P.? I believe it is generally understood that there are two brands in the market, one marked No. 1 and one marked No. 2.

The following statement was made in reference to the asserted variable solubility of sulphate of morphia.

MR. RICE.—In answer to Query 25, accepted on my behalf, I wish to say that I have made a number of experiments, all of which gave negative results. In consequence thereof I did not think it worth while to take up the time of the Association with a paper. I have found no difficulty in dissolving sulphate of morphia of any manufacture. The only thing necessary is to have patience, since some samples are in a state of solid, hard, compact crystals. I have not found any impurity in any sulphate of morphia in the market.

The Association then adjourned until Friday morning at 9 o'clock.

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*Sixth Session.—Friday Morning, September 10th.*

The Association met pursuant to adjournment, President Markoe in the chair. The minutes of the preceding session were read and approved.

MR. JARRETT.—I move that the paper read yesterday by Mr. Drury be referred back to the author for further investigation.

MR. LILLARD.—I move, as an amendment, that it be referred to some practical chemist to see if the statements in it are correct, and I would suggest that some chemist in this city be appointed on that committee.

MR. BABCOCK.—I should hardly indorse that amendment. The paper contains extraordinary statements, and, in view of the fact that no particulars are given (I think the gentleman should have given us further particulars as to his process, and some details as to the number of experiments made, the labels upon the bottles, etc.), I think it would be proper to refer the subject to him for another year, so that we may have a fuller report.

The motion of Mr. Jarrett was passed.

MR. SHARPLES.—I have a resolution to offer. A similar one to this has been passed by nearly every scientific body in the country, and I think it has as deep an interest to druggists and pharmacists in the country as any one else.

*Resolved*, That a committee of three be appointed to report upon the subject of metric weights and measures at the next meeting of the Association.

Nearly every society in the country has this subject under consideration. There is no body of men more deeply interested than druggists and chemists. They are not only bothered with one varying set of measures, but with two. They mix by one set and sell by another. The measures do not agree within themselves. The liquor measures differ in value from the measures by weight, and the conversion of one into the other involves a long and complicated calculation. Not one man in fifty fully understands how to convert liquid measure into solid measure; while the metric system, as every one knows, is perfect. If an order comes in for so many cubic centimetres of water, all we have to do is to weigh it out. It is there at once. This is a subject I think should be brought up before the meeting at some future time. It is too late to do anything at this meeting, and therefore I propose that a committee be appointed on the subject by the President.

MR. SAUNDERS.—Before the appointment of the committee I desire to mention, for the information of the Association, that there is a paper presented on that subject by Frederick Brooks, which will be read this morning, and perhaps that resolution would come better in order after the reading of that paper.

MR. SHARPLES.—In view of that paper, I will withdraw the resolution for the present.

The President announced the receipt of an invitation from Mr. Edward Burgess, Secretary of the Boston Society of Natural History, inviting the members to visit the building of that Society, located on Berkeley, corner of Boylston Street. The invitation was, on motion of Mr. Leis, accepted with thanks.

Mr. Bedford read a synopsis of the results obtained by his investigations on Commercial Ether, Query 2; Mineral Acids, Query 17; and Bicarbonate of Soda, Query 41. The papers having been mislaid or lost at the meeting, the author was requested to rewrite them, and furnish them to the Secretary in time for publication (see pp. 661, 689, and 722).

MR. MAISCH.—I would like to ask whether Mr. Bedford has examined the bicarbonates for alumina?

MR. BEDFORD.—I have not.



MR. MAISCH.—Some samples contain a little.

MR. MILLER.—Has any attention been paid to the amount of iron in the respective brands of bicarbonate of soda? I have had trouble from the allegation that some of the American brands contain more iron than the English. I was supplying parties with the Greenwich and another brand, and they stated that it turned the barrels black, and they compelled me to furnish Chance's soda.

MR. BULLOCK.—In the examination of the English bicarbonate of soda, made from sal soda, there would almost always be found traces of magnesia, I think.

MR. BEDFORD.—As the question treated of the usual impurities, I have not had the time to go into everything. I gave the usual impurities, the loss of carbonic acid, and the impurities of chlorides and sulphates present.

MR. MILLER.—The iron seems to be the only thing the brewers object to.

Mr. A. W. Miller read a volunteer paper on an Improved Method of Packing Herbs (see p. 572), and exhibited samples packed in the boxes described in the paper, which was accepted and referred. In answer to a question, Mr. Miller stated that the boxes cost about \$7 a thousand.

MR. SHARPLES.—Having called attention to this subject a few months ago, from the fact that I have been frequently imposed on in buying herbs for house use, I am very glad to see the plan adopted by Mr. Miller. Herbs put up in packages for house use are almost invariably worthless, and, in addition, as Mr. Miller says, they often fall short in weight. It will take a whole package of savory as bought to go as far as a single pinch will, if you dry it and save it yourself.

Mr. T. E. O. Marvin read a paper on the Preparation of Cod-liver Oil on the Coast of New England. It was accepted and referred (see p. 658).

The following report was received and read:

The committee appointed to propose the time for meeting of the Association in 1876, respectfully report that they recommend that the Association convene in Philadelphia on the second Tuesday, the 12th day of September, at 8 P.M.

They also report that the invitation extended to the Association by the delegates from Ontario, Canada, to hold the meeting of 1877 in the city of Toronto, has been cordially renewed.

W. J. M. GORDON,  
CHARLES BULLOCK,  
CHARLES H. DALRYMPLE.

MR. SAUNDERS.—I desire to mention that the invitation from the Ontario College of Pharmacy to meet in Toronto in 1877, is renewed in behalf of that

college, and as one of the delegates from that institution, I wish the members of the Association to bear that in mind, that there will be no getting out of going to Canada in 1877.

MR. WHEELER.—I move to amend by substituting the first Tuesday of September. Some of us are teachers in colleges and seminaries, and as a rule these institutions commence the first or second week in September, hence we are engaged the second week. It would be desirable to make it the first week for that reason.

MR. HOFFMANN.—I second the amendment, and I would call your attention to the fact that we expect many visitors from Europe, many of them being teachers in universities. The European universities close the 15th of August, and commence on the 1st of October, and these gentlemen can hardly stay so long away. I think we should take that into consideration. It might be a week earlier to give them an opportunity to attend.

MR. BULLOCK.—There was another feature which led the committee to fix the time a little later, namely, the hot weather we frequently have early in September in Philadelphia. One week makes a great difference. It will be much more comfortable the second week than the first. Another object was, that among the many exhibits which the Centennial Commission intends to make will be one of the pomological exhibition, embracing the products of the United States. It will at that time be in full blast, and the committee thought it would be well on that account alone to make it the second week in September.

The amendment of Mr. Wheeler failed to pass, and the original motion, as recommended by the committee, was then adopted.

The Business Committee offered the following resolutions of thanks:

*Resolved*, That the thanks of the visiting members of the American Pharmaceutical Association be, and are hereby, tendered to our "*brethren and friends in Boston*" for the courteous attentions they have, during our abode among them, so lavishly, in many enjoyable ways, extended towards our ladies and members, and that their liberality and hospitality will ever be recognized as one of the most pleasurable experiences of our lives.

*Resolved*, That our thanks be tendered to the "press" of this city for their correct and full reports of the Proceedings of this Association.

*Resolved*, That also a vote of thanks be tendered to Orlando Tompkins, Esq., lessee of the Boston Theatre, for his kind invitation extended to our ladies and members.

MR. GREGORY.—On behalf of the Ontario College of Pharmacy I beg to support the motion with all my heart, and to say to the members that when they come to Ontario they will be as heartily welcome. I hope it will not be lost sight of by this Association.

MR. BAKER.—I rise to indorse what the gentleman from Canada says, in behalf of the Richmond delegation.

The resolutions were adopted unanimously, and the Business Committee presented the following:

*Resolved*, That a special committee of three be appointed to report what changes or amendments may be necessary in the by-laws of the Association, and that the action of the committee be printed for the use of the members at our next meeting.

THE SECRETARY.—Do I understand it is the intention to refer all the proposed changes to this committee?

MR. LEIS.—Yes, sir.

The motion was carried.

The Nominating Committee presented the following report:

The Nominating Committee have considered the election of Local Secretary, and unanimously recommend Dr. Adolph W. Miller be elected to that office.

CHARLES A. TUFTS,  
Chairman.

The report being received, the President, on motion of Mr. Peixotto, was directed to deposit an affirmative ballot for the nominee, and Dr. A. W. Miller was declared elected Local Secretary for the coming year.

The Committee on Queries read the following report:

The Committee on Papers and Queries respectfully report that the following subjects have been accepted by the members named for investigation and report at the Twenty-fourth Annual Meeting of this Association in 1876.

QUERY 1. An essay on Senega Root, embracing the history of its introduction, its geographical range, and its present importance as an article of commerce.

*Accepted by J. D. Wells, Cincinnati, Ohio.*

2. What knowledge of therapeutics should the properly educated pharmacist possess?

*Accepted by Benjamin T. Fairchild, New York.*

3. A treatise on Salicylic Acid, its solubilities and pharmaceutical uses.

*Accepted by R. V. Mattison, Philadelphia.*

4. How does the quality of spirit of nitrous ether of the market compare with the requirements of the U. S. P.? On keeping in half-filled bottles it becomes acid; is this due to aldehyd; and is the latter of therapeutic value

in the preparation? If not, can it be removed economically, and would its removal render the preparation more permanent?

*Accepted by P. W. Bedford, New York.*

5. According to Z. Roussin the sweet taste of liquorice root is due to an ammoniacal compound of glycyrrhizin (see Am. Jour. Pharm., 1875, Sept.). Query. Can the fluid extract of liquorice root, U. S. P., be mixed with solutions of alkaloids, so as to mask their taste without precipitating them?

*Accepted by William McIntyre, Philadelphia.*

6. An essay on the various fluid extracts of commerce, with the view of determining how near they come up to the required standard.

*Accepted by Charles Rice, New York.*

7. Can any of the decoctions or infusions of the U. S. P. be satisfactorily prepared from the fluid extracts of the U. S. P., and in what particulars do they differ from infusions and decoctions prepared in the prescribed manner?

*Accepted by John Henry Hancock, Baltimore.*

8. Five grains of citric acid added to the finished product of the formula of the U. S. P., for syrup of ferrous iodide, seems to preserve *unchanged* the appearance of the syrup. Is this addition admissible?

*Accepted by W. H. Pile, Philadelphia.*

9. *Paullinia sorbilis*. A treatise on this article furnishing a formula for a liquid preparation of the drug.

*Accepted by G. W. Kennedy, Pottsville, Pa.*

10. How are compressed pills prepared, and what advantages, if any, do they possess?

*Accepted by John Henry Hancock, Baltimore, Md.*

11. The fluid extract of cotton-root bark occasionally gelatinizes on keeping; can a modification of the process for making this fluid extract be suggested which will prevent such a change? To which principle and to what influences is it due, and has the bark of the green root any superiority over that of the dry in the preparation of the fluid extract?

*Accepted by J. U. Lloyd, Cincinnati, Ohio.*

12. What chemicals may be profitably made by the retail pharmacist, and what apparatus is required for their preparation?

*Accepted by James R. Mercein, Jersey City, N. J.*

13. It is believed by some that hops possess valuable medicinal properties aside from the lupulin and the little tannin. What are the properties of hops from which the lupulin has been completely removed?

*Accepted by P. W. Bedford, New York.*

14. What is the best process for determining the medicinal value of hops and of lupulin?

*Accepted by P. W. Bedford, New York.*

15. What is the nature of the union in the combination of equal parts Chloral Hydrate and Camphor?

*Accepted by Joseph Roberts, Baltimore.*

16. The fixed oils of benne and poppy seed are not protected from oxidation, according to Cloëz, by keeping them in colored bottles (*Journal de Pharmacie et de Chimie*, 4 ser., ii, 345; *Am. Jour. Pharm.*, 1866, p. 86). Query. How are non-drying oils, such as olive, almond, and lard oil, affected when kept under similar circumstances, and what effect has the summer and winter temperature upon the results?

*Accepted by Thomas E. O. Marvin, Portsmouth, N. H.*

17. Is the oil of Ceylon cinnamon used in the preparation of cinnamon-water as directed by the U. S. P.?

*Accepted by Edward C. Jones, Philadelphia.*

18. The ground bulb of *Scilla maritima* when moistened with diluted alcohol and worked with the hands causes for a time an intolerable itching. To what principle in the bulb is this effect to be ascribed?

*Accepted by Edward D. Chipman, Philadelphia.*

19. An essay on the bromine production of the United States.

*Accepted by Henry S. Wellcome, New York.*

20. The resin of *Leptandra Virginica* (the leptandrin of commerce) varies much in appearance and sensible properties. To what causes are these varying results to be attributed? What is the best process for the preparation of the resin, and what is the average yield from the root?

*Referred to H. G. Keasbey, Philadelphia.*

21. How far are the so-called resinoids of commerce prepared according to the prescribed formulas, and can better processes be devised for the preparation of some of the more important of them?

*Accepted by W. J. M. Gordon, Cincinnati.*

22. How do the preparations *Succus Conii* and *Hyoscyami*, as found in the English markets, compare medicinally with the officinal tinctures made from the carefully prepared and dried herbs?

*Accepted by Charles L. Eberle, Philadelphia.*

23. In preparing emulsions of almonds and other seeds considerable force is required to reduce the seeds to a uniformly smooth mass in order to insure their exhaustion with water. Query. What is the best shape and material for mortars adapted to this purpose?

*Accepted by E. Gregory, Lindsay, Ontario.*

24. To what extent does sulphuric acid occur as an adulteration or accidental impurity in tartaric acid?

*Accepted by J. Williams, Worcester, Mass.*

25. The root of *Epilobium angustifolium* is said to have been used with success in the treatment of aphthæ. Is this opinion well founded, and if so, to what principle in the root is its remedial action to be attributed?

*Accepted by C. J. Biddle, Philadelphia, Pa.*

26. The phosphorus of commerce is often contaminated with arsenic. In what proportion is it present in the various brands of phosphorus found in the American market?

*Accepted by Louis Dohme, Baltimore, Md.*

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27. The character of the Peruvian barks supplied to the public by the retail druggists of America.

*Accepted by P. W. Bedford, New York.*

28. An essay on *Gelsemium sempervirens*, embracing the questions as to what principle its activity is due, and whether the green root possesses any advantage over the dry.

*Accepted by W. H. Jones, Boston, Mass.*

29. Is it advisable to have an officinal aromatic spirit that will represent a fine refreshing cologne to be used in lotions and for the sick-room? If so, give a formula and name for the preparation?

*Accepted by George Leis, Lawrence, Kansas.*

30. What advantages would result from the substitution of parts by weight for absolute quantities in the revision of the Pharmacopœia, and if any disadvantages other than those incident to change, what are they?

*Accepted by S. P. Sharples, Boston.*

31. What advantage is there in retaining *alcohol* in Tinct. Ferri Chlor.? Would it be desirable to introduce *Liquor Ferri Chlor. dilut.* of the same iron strength in place of the tincture?

*Accepted by M. S. Bidwell, Elmira, N. Y.*

32. What is Lactopeptin?

*Accepted by Emil Scheffer, Louisville, Ky.*

33. Is it desirable and practicable to introduce in the revision of the Pharmacopœia an assay morphia strength for Tinct. Opii, in place of the present formula yielding a product of indefinite morphia strength?

*Referred to R. J. Brown, Leavenworth, Kansas.*

34. A convenient working formula for Wine of Tar, with samples of product.

*Accepted by Charles A. Heinisch, Lancaster, Pa.*

35. A preparation under the name of Damiana has been recently introduced. What is it? Its medicinal value? An essay on the subject.

*Accepted by Henry S. Wellcome, New York.*

36. What progress has been made in manufacturing important medicinal chemical preparations within the last few years which formerly were exclusively imported?

*Accepted by Dr. A. W. Miller, Philadelphia.*

37. It has been repeatedly asserted that the castor oil of the present day is deficient in strength, larger doses being required than formerly. Is this so? and is it on account of adulteration?

*Accepted by C. Gilbert Wheeler, Chicago, Ill.*

38. An examination into the accuracy of the graduated measures supplied by the jobbing druggists or manufacturer—which are most reliable?

*Accepted by S. P. Sharples, Boston, Mass.*

39. How much acacia is needed to emulsify perfectly the fixed or volatile oils and balsams?

*Accepted by E. Gregory, Lindsay, Ontario.*

40. An essay on wafers for the administration of powders, including mode of manufacture, working formula, and samples of product.

*Accepted by G. A. Zwick, Covington, Ky.*

WILLIAM SAUNDERS,  
Chairman.

The report was accepted and referred for publication.

The following volunteer papers were read: On the Manufacture of Rubber from Milkweed, by William Saunders (see page 655), who exhibited samples of the herb, and rubber made from it; on Cachet de Pain, by Joseph P. Remington (see page 614); and on Iodide of Arsenic, by James F. Babcock (see page 693).

MR. BABCOCK.—In the preparation of this substance I came upon a singular reaction, which I have not yet sufficiently studied, but which I will present to the Association at this time so far as I have investigated it. Iodide of arsenic dissolves in water, yielding a nearly colorless solution, which is of a very pale straw color when concentrated. So long as the temperature is about 160° (I have not ascertained the temperature exactly), the crystals and scales are deposited of a bright orange color, but after the solution is cooled below this point the crystals are white. I at first supposed these white crystals were substances of a different character analogous to the white body produced when iodide of arsenic is dissolved in cold water. But when these white crystals are dried, or are exposed to the sunlight, or heated to a temperature above 160°, they acquire the scarlet color of the iodide of arsenic as prepared by the process I have described. I know of no other instance of a white substance becoming red upon being heated. We have, of course, the well-known change that takes place in the compound iodide of mercury on the application of heat, from a scarlet color to a light yellow, which subsequently passes spontaneously into the red modification; but here we have a substance which is white, and upon the application of a slight degree of heat passing into the red modification. I have some of the iodide of arsenic here as it was dried upon the plate. One side, that exposed to the light, being scarlet, and the other side, which was kept from the light, is generally white. But during the week or ten days it has been exposed to the light it has partially changed, and by continued exposure would change completely. I also have a sample of the iodide of arsenic which has been fused, to show the difference in color between that which is pure when fused, and that which contains iodide of iron or other impurities when fused.

The Secretary read the following communication:

Boston, September 9th, 1875.

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Conference of the Schools of Pharmacy, at the sixth annual meeting,

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held this evening at Odd Fellows' building, has passed the following resolution:

*Resolved*, That this conference communicate to the American Pharmaceutical Association that they are in possession of documentary evidence that the Tennessee College of Pharmacy has offered, through its Treasurer and acting Secretary, to examine candidates, and graduate them without their attending the customary courses, just the same as if they had attended all the lectures.

CHARLES A. TUFTS,  
President Conference of Schools of Pharmacy.  
JOHN M. MAISCH,  
Secretary.

MR. KENNEDY.—To bring this matter properly before the Association, I ask for information as to whether or not the person who is alluded to is a member of this Association. I move the acceptance of the communication, and shall call for the information afterwards.

The motion to accept the communication was adopted.

MR. TUFTS.—In answer to Mr. Kennedy's question, I would state that the gentleman alluded to is a member of this Association.

MR. BIDWELL.—As I understood the communication, no particular person was alluded to, but only the Tennessee College of Pharmacy.

THE SECRETARY.—It reads: "The Tennessee College of Pharmacy has offered through its Treasurer and acting Secretary."

MR. ROBERTS.—I call for the evidence, for the basis of the accusation which has been laid before the meeting.

THE SECRETARY.—This communication is based upon a letter in possession of the Conference, signed by the Treasurer and acting Secretary of the Tennessee College of Pharmacy.

MR. ROBERTS.—That communication has the appearance of an official document?

THE SECRETARY.—It has.

MR. BEDFORD.—In order to bring this matter before the Association, I move that the Secretary of this Association be requested to communicate with the Tennessee College of Pharmacy, and inquire whether such action is authorized by the college, or was only undertaken upon the individual responsibility of its officer.

MR. LILLARD.—I second the motion as one of the representatives of the Tennessee College of Pharmacy. I would like to state that this is the first information I had of anything of the kind here. I do not know exactly in what way or how this is a matter of interest to the American Pharmaceutical Association, or even exactly to the Convention of Teaching Colleges. The Tennessee College of Pharmacy is not represented in the Convention of Teaching Colleges. It has sent no delegate, and has made no application, and no effort to be represented at that meeting. So far as this letter is concerned, I do not know anything about it. I suppose it refers to me directly in some way, but I would state this, that the Tennessee College of Pharmacy has had



probably five or six hundred applications every year from gentlemen in all parts of the country, from Nova Scotia down to Texas, and from East to West, almost every State. A great many of them were graduates of other colleges of pharmacy, and wanted to know upon what terms they could receive the degree of that college. These have been replied to, so far as I am aware, generally stating that those who were graduates of other colleges would not be required to attend two full courses of lectures. I do not know of any other statements having been made in regard to them. I know it is customary with other colleges to admit students who have attended one course to apply for graduation without attending two full courses.

MR. KENNEDY.—I understand Mr. Lillard to say that graduates of other colleges applied to that college to know the particulars as to what it required in reference to obtaining the degree. It seems to me, if they are graduates already of colleges, that they would not want to graduate over again.

MR. LILLARD.—I do not think it is necessary to go into the explanation of that matter. I would only state that the Tennessee College of Pharmacy is based on an entirely different basis from any other college of pharmacy in the country. It is the first college of pharmacy in this country that requires for graduation a practical knowledge of analytical chemistry and botany, and by resolution of a recent meeting of the trustees, information of which I only received yesterday, they now require also a knowledge of the practical use of the microscope, and have added a professorship of that kind. For these reasons they offer a regular degree, and not the title of graduate in pharmacy, which the majority of the other schools have been doing.

MR. SAUNDERS.—It seems rather strange that the Tennessee College of Pharmacy should require so high a curriculum, and yet these things should be offered on the other hand without any teaching whatever. If this document is a document that could be produced to the meeting, I would suggest that it be produced, and that we learn something about it. The fact of degrees being offered by members of this Association for a money consideration alone, without any qualification on the part of the applicant, I think is a matter the Association should not pass lightly over. I do not know whether it would be in order to produce the document or not.

MR. ROBERTS.—I second the motion of Mr. Saunders. I think it is due to Mr. Lillard to let him see upon what basis this charge is made.

MR. LILLARD.—I seconded Mr. Bedford's motion in hopes the whole matter would be ventilated, and that the committee would make official inquiry, and find out exactly the full particulars of the case, and if there is anything wrong I will be the first one to see it is properly corrected. I want the whole matter to be thoroughly investigated, to find out just exactly how the matter stands before we take any action upon it.

MR. KENNEDY.—I think that would be the proper way to get the information before the Association. I therefore second the motion of Mr. Saunders.

Mr. Bedford withdrew his motion, and the motion that the evidence be produced was carried. The Secretary then read the following letter:

## 832 MINUTES OF THE TWENTY-THIRD ANNUAL MEETING

NASHVILLE 10 Dec. 1874

W. H. PATTERSON—Yours to College of Pharmacy to hand, I send you a copy of the "Gazette" by mail to-day, would be glad to have you get up a club for it, or subscribe, I also send a blank to be filled out and returned if you wish to *matriculate*, (the fee, 5\$, must accompany the application). You could matriculate now, without being present, and could then take out your tickets as you desire, and attend whenever you could, after getting tickets for two sessions you could come up for graduation at the end of any session, just the same as if you had attended all the lectures, If you wish any further information will furnish it cheerfully.

Yours &c

B. LILLARD

Treasurer & acting Secretary.

MR. BABCOCK.—I do not see how this matter is of very special interest to this large meeting here. It may be of interest to a comparative few, but I do not think it is within the province of this Association to consider a private letter which has been written by a gentleman of this Association to another gentleman in regard to a matter which I understand does not come at all within the scope of the Association. If I read the constitution aright, I find that the objects of the Association are:

1. "To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulteration."

It does not come under that head.

2. "To encourage proper relations between druggists, pharmacutists, physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage."

8. "To improve the science and art of pharmacy, by diffusing scientific knowledge among apothecaries and druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business."

MR. BULLOCK.—Will the gentleman go on and read clauses five and six?

MR. BABCOCK.—I was reading the third, and should have come to five and six in due course of time. The fourth is as follows:

4. "To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing, and selling medicines.

5. "To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated druggists and apothecaries.

6. "To uphold standards of authority in the education, theory, and practice of pharmacy."

I would like to inquire how the Association proposes to interpret that clause of their constitution, clause six? If I read that aright, what is intended, and what a person would understand at the first reading of it, would be to uphold such standards of authority as the United States Pharmacopoeia, scientific

books, and recognized scientific authorities, not to attempt to say what an educational institution regularly incorporated under the laws of the State where it exists shall do. I do not care a button for the Tennessee College of Pharmacy. I never was there, and probably never shall be there. I have a limited acquaintance with one gentleman who comes from that section, and it does seem to me this is an attempt on the part of a few individuals to bring into this Association a matter which has no business here, simply to gratify some personal feeling or personal spite or something. I do not know what it is, but it is not scientific business. It does not tell you how to make phosphoric acid without the trouble that formerly attended its manufacture. It does not tell you how to make pills. It does not give you any information, nor foster any feeling but that of a personal character. Therefore I move that the whole subject be indefinitely postponed.

MR. SAUNDERS.—I rise to object to that.

MR. BABCOCK.—I think this matter is not debatable.

MR. ROBERTS.—I think it is a matter of importance for us to inquire into the standing, professional practice, and character of those we associate with.

THE SECRETARY (reading Art. II, Chap. 9, of the By-laws).—"When a question is regularly before the meeting, and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely, which several motions have precedence in the order in which they are arranged. A motion to *adjourn* shall be decided without debate."

MR. SAUNDERS.—I do not think this is a personal matter at all. I have no feeling either for or against the Tennessee College of Pharmacy, but I have a strong feeling that we should uphold the principles of our organization here. The Association has always been characterized by honor and integrity among ourselves and among the organizations which we recognize, and I quite disagree with Prof. Babcock that this is not a fit matter to bring before the meeting. I regard it as one of the things that we should consider. Circumstances of this kind arising require, it seems to me, careful consideration, and any attempt to throw them overboard by saying they are matters of personal spite, I think is in very bad taste, and is not the usual course among members of this Association.

MR. SHEPPARD.—This matter has just come to my attention. I have read the letter over. It is written and signed by a party as an officer of the Tennessee College of Pharmacy, and I confess that to my mind it looks very black. I have just asked Mr. Lillard if he can explain it, and he says he can.

MR. LILLARD.—So far as I am individually concerned, I have just read the letter over myself, also, and I do not see anything very black about it except the ink; and if any one will look at that letter carefully, they will see that I only wrote the man, whoever he was, because I have no recollection now. We had so many documents of this kind, and a large majority of them were never answered. I only wrote him that he could matriculate without being present, and come up for graduation; not that he could graduate, that he could apply for graduation, that was all.

**THE SECRETARY.**—Just the same as if he had attended all the lectures?

**MR. LILLARD.**—Yes, sir. I would state further, that I know of parties who have done that in other colleges of pharmacy. I know of a young man, not personally, but have heard it from good authority, who matriculated at the Louisville College, staid there a week or two, went home to Philadelphia, matriculated at the Philadelphia College, and graduated there at the same session. I know it has not been customary, where parties are graduates of other colleges of pharmacy, to require a full attendance on all the lectures from them if they have had all the other qualifications and stood a thorough examination. I am satisfied that the Tennessee College has acted honorably and fairly about this and every other matter that has come before it, and demand a thorough investigation of everything it has done; and if anything can be found out in any way, or be construed in any way to reflect upon the College, I will not have any objection to make.

**MR. DIEHL.**—I challenge Mr. Lillard to produce the evidence to the Association upon which the charge is based which he has made in regard to the Louisville College of Pharmacy.

**MR. SAUNDERS.**—I think I must be laboring under a delusion. I will just state how I understand this thing. I supposed this applicant was a man who had had no previous education; that he applied to the Tennessee College of Pharmacy to obtain a diploma, and it is granted to him on the supposition that after he has got the diploma he must take out the tickets and pay the money, and may if he likes go on and qualify himself and pass an examination, or may do the other thing, just as he pleases. He will have his certificate of qualification before he is qualified in any way. That is the way I understand it. If Mr. Lillard thinks that is creditable to the College, I must differ with him. No college could be for the purpose of advancing the interests of pharmacy if they adopt a course of that kind. They are doing just the reverse of what they profess to do.

**MR. RUST.**—I presume every organization has a code of ethics, and shall be the judge of what is gentlemanly and honorable. One may consider one thing honorable which another does not. One man may consider it honorable to put up an article under a false name, but the code of ethics of this Society, as I understand it, would not indorse any such action.

**MR. FEHR.**—I only wish to make this statement. I engaged a young man with a diploma from Philadelphia. I do not remember his name, but I can give it to you by looking at home in my books. I engaged him because he had papers from Philadelphia; but, after having been two days in the store, I found that he had no knowledge of pharmacy. I only want to point that out to know if he had a diploma or only a certificate.

**MR. EBERLE.**—The young man may have either stolen it or purchased it. We do not admit that any person goes from the Philadelphia College of Pharmacy without any knowledge of pharmacy.

**MR. FEHR.**—I would wish that such a thing could be found out, if it was possible.

**THE SECRETARY** —If you wish you can buy all kinds of diplomas in Philadelphia, but not from the Philadelphia College of Pharmacy.

**MR. SHEPPARD.**—I believe I always try to do the square thing by everybody. I want to do it now. This matter has just come to my notice. I see that Mr. Lillard is very nervous. I should judge he was not a man that was accustomed to talk much. I have just asked him this question, Has the Tennessee College of Pharmacy given its diploma, or will it ever give its diploma, so far as he is concerned, to any person who has not attended a large majority of the lectures? He says it has never given its diploma, and that it never will, so far as he has authority in the matter, to any party who has not attended a large majority of the lectures; that this letter is intended to convey the idea that a person need not attend every single lecture. Am I right in my statement?

**MR. LILLARD.**—Where they were graduates, or represented themselves as graduates of other colleges of pharmacy, we wrote and published that where they so represented themselves to us, we did not require them to attend all the lectures; and that is nothing more than all the other colleges do. If a man writes "I am a graduate of the New York or Philadelphia College," and wants to know if he can graduate without attending all the lectures, we write that he can.

**MR. SHEPPARD.**—A majority or not?

**MR. LILLARD.**—If a person has attended one course at one college he will be taken as a second-course student at any of the others, and they would require him to attend only one course.

**MR. SHEPPARD.**—Your college requires him to attend none?

**MR. LILLARD.**—We require him to attend one if he is a graduate of another college. I suppose this gentleman wrote representing he was a graduate of some other college, and wanted to know if he could graduate without attending all the lectures. That is my idea about it.

**MR. SHEPPARD.**—I think the Massachusetts College has the same rule, that a man coming from another college need attend but one course.

**MR. KENNEDY.**—The letter just read does not state so. I think Mr. Lillard in order to place himself in a proper position should have written to this party, explicitly stating the full particulars. He does not state "you should have attended a year at some other college," but writes in the letter and states, "You will have to pay \$5 matriculation fee and the fees for two sessions," regardless of the attendance at the lectures.

It seems to me the whole thing looks as if the Tennessee College of Pharmacy wants the money and nothing else.

**MR. LILLARD.**—I do not want to monopolize so much of the time of the Association, but, as I have before explained, we have had a great many applications of this kind. A great majority of them are not answered at all, but when parties wrote to us stating they were graduates of other colleges, and were dissatisfied with the titles they had and wanted to have a regular degree, we replied to them. We wrote they must matriculate and pay for two courses of lectures, and then they could apply for graduation. That is the

point. After applying for graduation, if a man was not found competent, and could not pass an examination, he could not graduate.

MR. ROBERTS.—The statement that has been made as to this special case is this: that the young man was a person proposing to study pharmacy as an occupation in life. He wrote to this college with the special information that he was not a pharmacist and received this information, and afterwards, not caring to travel that easy road to pharmaceutical honor, qualified himself afterwards at another college.

MR. RUST.—I may have misunderstood that letter, but from the reading I understood it to be this: it was an invitation to this person to get them members, and they could do so by paying \$5. That is the impression I got. I think it was an offer for any one to come in who would pay the money.

MR. MILLER.—It strikes me it is very clear, from the fact of tickets for two full courses being insisted upon in the body of the letter and two payments made, that no allegation was made that the party was a graduate of another college.

MR. BIDWELL.—It is evident to any one that has any familiarity with the law at all that we have not, and cannot have at this time, sufficient evidence to enable us to take any action. This letter is consistent with an honorable interpretation and also with that which has been given to it, namely, that the college of pharmacy is ready to sell its degree of Doctor in Pharmacy for the regular fees, without requiring any attendance or any examination. Which of those two interpretations is to be put upon it has to be determined by other evidence, which we have not before us. I do not see that we can take any intelligent action upon it. I think it is desirable that Mr. Lillard should in some way clear himself and his college from the imputation of selling degrees without any examination, but I certainly do not think we ought to take any action upon such evidence as has been brought before us, because we do not positively know the full facts.

MR. BEDFORD.—For that reason I offered the resolution to bring out the full facts, and when it is in order I shall renew the resolution.

MR. LILLARD.—It was for that reason I wanted to see this subject freely investigated, and as Mr. Bidwell remarks that we were selling diplomas without any examination, when there is nothing said about examination in that letter at all, I am in hopes that the motion of Mr. Bedford will prevail, and you will appoint a good investigating committee, and that they will go to work and see if they can find out anything.

I am perfectly well satisfied to have the subject freely investigated and ventilated, and if there is anything to be found out I have nothing more to say.

I know what has been done has been done right. We have had a great many temptations, and in many cases we thought we could see what was behind the letters, trying to get us into such a scrape as this. For that reason many letters were unanswered; but when a man wrote a plain letter saying he was a graduate, and did not think he ought to attend two full courses, we did give him some such reply as this. If this matter is referred to a committee, and is freely ventilated, I am satisfied it will be found we have done

nothing wrong, and at the same time that we have had a great many temptations, a number of which we think were made up to try to get us to do something wrong. There has been a strong opposition to the college, and an antagonism on the part of the Convention of Teaching Colleges. They have tried to kill it out, and find out something bad about it, or make something bad about it, and have done everything they could to injure the college; and for that reason I hope it will be investigated and decided on the merits of the case.

MR. BEDFORD.—I would simply state that the resolution which I offered a moment ago will bring the matter into proper shape. It is impossible now to decide properly on it, and if Prof. Babcock will withdraw his motion for postponing I can offer it.

MR. BABCOCK.—I will withdraw the motion.

MR. BEDFORD.—I move that a committee be appointed by the Chair, and be instructed to communicate with the officers of the Tennessee College of Pharmacy, and inquire whether the communication in possession of the Secretary, and of which a copy is to be furnished with this resolution, is authorized by the college, or is the individual action of the Treasurer and Acting Secretary.

Allow me to say one word in regard to something Mr. Lillard just said. He accuses the Convention of Teaching Colleges of trying to find out and do things for the purpose of injuring the Tennessee College. I can assure Mr. Lillard there is no such feeling so far as I know. I know all the persons who have been present at those meetings. It was not the desire of the Convention to do anything of the kind. The information came without their seeking it.

MR. LILLARD.—That part of my remark was made intelligently, and I have information which I think any man who is not prejudiced would say was clearly in that direction. I do not accuse any member individually. I know they are very zealous on their side of the question, and that there is a direct antagonism between that college and the Convention of Teaching Colleges. I do not blame them for being enthusiastic, but I want everything done fairly, and no underhanded tricks or anything of that kind.

MR. BULLOCK.—In seconding the resolution I wish to say I think the course proposed is eminently proper. We have before us a matter that eminently concerns the interests of this Association, and I for one should be very unwilling to see a sister institution dealt with by this Association without giving them a fair chance to see the charges brought against them, and hear their replies. It may be there is something here which can be explained. I should be very sorry if it cannot. So far as the arguments have been urged that it does not concern this Association, I would call attention to Paragraph 7 of Article I of the Constitution.

“To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.”

If this thing has been done knowingly and intentionally, how can this Association receive delegates from that college unless they promise to amend their ways?



**MR. BABCOCK.**—I hope that a committee will be appointed to look into this matter, and I desire to make an amendment to the motion of Mr. Bedford. I have phrased it a little differently, so that the motion would read that a committee be appointed to inquire whether the Tennessee or other colleges have granted degrees without examination. When this committee is organized and is ready to receive evidence, there may be some evidence to present to the committee in regard to some other colleges, without going so far as Tennessee to find it.

**MR. BULLOCK.**—I object to inquisition without evidence.

**MR. EBERLE.**—We do not want a committee appointed to bring accusations or search for accusations against any one. This is a special case, and if Prof. Babcock becomes at any time aware of such information against other colleges their cases can come up. The Tennessee is the only one now to be dealt with in this direction. I agree in regard to there being more than one construction of this matter, and agree with the speakers in the desire to have justice done.

**MR. ROBERTS.**—I suppose this committee will be empowered to report at our next annual session.

**MR. LILLARD.**—I would like to second Prof. Babcock's motion. I think it is the proper and correct thing to do. I do not see why one college should be singled out. I have heard intimations about others, and if there are other things that can be brought out, why not have a full and fair investigation, if anything. I do not believe in hiding anything myself. I like to see everything fairly and freely investigated, not only one college, but all of them, and if any of them are doing anything that this Association does not like, it is proper for the Association to take action upon it.

The question was taken on the amendment offered by Mr. Babcock, which was lost; the original resolution as offered by Mr. Bedford was then passed.

**MR. CALDER.**—Would that resolution cover anything more than an inquiry as to that single letter? A simple answer, "yes" or "no," is all that might be obtained. Is it understood that the resolution is intended to cover the whole matter?

**MR. MILLER.**—Cannot the object of the resolution be reached more clearly by asking Mr. Lillard the plain question?

**MR. LILLARD.**—I have explained the matter two or three times.

**MR. CALDER.**—All we may get in that case would be a negative answer.

**MR. EBERLE.**—Then it would remain to deal with the gentleman writing the letter. The college is an incorporated one and its code is well laid down, so there can be no mistake as to what it can be; and if they deny that the individual members can do anything else, it brings it down to the individual member.

**MR. KENNEDY.**—The question is whether the college of pharmacy, either in its corporate capacity or through its agent, has done anything which we con-



sider disreputable. The question of the interpretation of that letter depends entirely upon the context of the letters which preceded it.

MR. LILLARD.—It is not the disposition of the Tennessee College to conceal anything about this or anything that is done. The gentleman need not be uneasy about that point. I only regret it was not his disposition to investigate other institutions in the same way that could be mentioned.

MR. BABCOCK.—I desire to offer a resolution, that a committee be appointed to receive evidence of the granting of degrees without an examination by other colleges. I desire to say, if this committee is appointed, that I will present some evidence to it. Of course, I have no evidence here this morning, no documentary evidence, nor any records, etc. I had no idea any action of this kind was to be taken, but now that the matter has been brought up, and that the Association have expressed their feeling in relation to it, which I think is a very proper one, that the matter should be inquired into as regards one college, and, as I say, I have evidence to bring in regard to some other institution, I would ask for a committee to receive evidence in regard to other institutions.

MR. BULLOCK.—I think that is entirely out of parliamentary ways. If the gentleman has any evidence, I sincerely hope he will present it in the same way that this has come, and let it go to the Conference of Colleges.

MR. CALDER.—It is time to try a man when the charge is made against him. I should be as ready to investigate a charge as anybody, but I desire the charge before the investigation is made.

MR. SAUNDERS.—I think Mr. Babcock is easily converted. Only a few moments ago he did not think it was a fit matter to bring before the Association. Now he wants to bring the whole matter before the Association.

MR. BABCOCK.—I agree with the gentleman. I think it is not a matter for the Association as I read the constitution and the by-laws, but the Association have decided that, and if you are going to deal with one college you ought to deal with all. If I were to state the charges I had to make I should be laughed down. I say it, and say it honestly, if this committee is appointed I will present some evidence against another college. I do not desire to mention the evidence at present, but I do say, if this committee is appointed I will present evidence of the granting of degrees to gentlemen who have not passed their examination. I have no time to set down, nor could I this morning write out specifically the charges, but I have the evidence, and there are gentlemen in this room who have it, and are knowing to the facts; therefore, I ask, if this Association is to take such steps as it has taken to purify itself, and is so desirous of being kept pure, I trust they will not hesitate to receive evidence upon a subject which is of great interest to them. If it was proven the facts were not as stated, there would be no harm in the investigation and the college would come out all the purer. Mr. Lillard says he desires to have the fullest investigation.

THE PRESIDENT.—The Chair will rule the motion out of order, as it is not the province of the organization to act as a committee of investigation into the affairs of a college until charges are made.

MR. ———.—I hope if there is to be an investigation of any one college, the whole will have the same chance. It seems to me it is eminently proper that an investigation of the kind should be made, when a member gets up and says he has evidence, and if you give him time he will produce it.

MR. LILLARD.—It seems to me, as a matter of fairness and justice, which I think most of the members of the Association are disposed to give, that as Prof. Babcock states that he has everything in readiness to make charges, that he shall be heard and shall have a committee, and that these reports shall be brought up at the next meeting. I think it is only justice to the Tennessee college and myself, that this whole thing should be fairly and honestly investigated, and if there are any colleges that are not doing right, let us know all about it. Let us have the full particulars.

MR. BABCOCK.—Do I understand the Chair to rule the motion as out of order? If so, I desire to appeal from the decision of the Chair, and call for the yeas and nays.

Mr. Babcock subsequently withdrew his appeal, and the reading of papers being resumed, the Committee on Papers stated that the paper written by Mr. Eberbach, on the composition of the nostrum Vinegar Bitters, had been mailed, but was not yet received. The paper was ordered to be referred for publication.

Mr. Saunders read a paper on Cachet de Pain, by Joseph P. Remington (see page 614), and Mr. Sheppard one on Grindelia Robusta, by James G. Steele (see page 687). The latter paper was accompanied by specimens of the plant, and of the various galenical preparations. Both papers were ordered to take the usual course.

MR. MARKOE.—I wish to call attention to the fact that the present Pharmacopœia process of making spirit of ammonia yields a very unsatisfactory product, never twice alike; that the description given of it is wrong, inasmuch as the materials taken by the Pharmacopœia never give a colorless solution. The small amount of organic matter derived from the casks in which alcohol is sold, produces with the ammonia gas a more or less deep yellow color. This objection can be overcome by redistilling the alcohol previous to conducting the ammonia gas into it.

MR. MILLER.—In view of the special interest which attaches to Vinegar Bitters, and of the fact that Mr. Eberbach's paper has not reached us, I would make a motion that the Secretary be requested to publish an abstract of it in the Journal of Pharmacy in advance of the publication of the Proceedings.

The motion of Dr. Miller was carried.

A paper on Hydrocyanic Acid, by J. U. Lloyd, was read, accepted, and referred (see page 695). Several specimens of the acid, prepared by the process recommended, were shown.

The Executive Committee reported the names of the following applicants for membership in the Association:

*District of Columbia.*

S. E. Lewis, Washington.

*Maine.*

Lebbens Curtis, Searsport.

*Massachusetts.*

William P. Bolles, Boston.

W. Bush, Worcester.

Edwin F. Carey, Boston.

Zephirin Fortier, Fitchburg.

E. G. Frothingham, Haverhill.

James T. Jones, Boston.

George W. Warren, Boston.

Nelson Samuel Whitman, Hudson.

William Henry Willard, Worcester.

Samuel W. Winslow, Boston.

William R. Wright, Boston.

*New Jersey.*

Eugene A. Carroll, Morristown.

*New York.*

S. E. Nicol, Brooklyn.

Theodore Ricksecker, New York.

*Ohio.*

William A. Stout, Springfield.

*Rhode Island.*

William A. Frost, Newport.

Messrs. D. Hays and R. W. Gardner were appointed tellers, and reported the election of the candidates.

Mr. Sharples again introduced the following motion, which had been previously withdrawn (see page 822):

*Resolved*, That a committee of three be appointed to report upon the subject of metric weights and measures at the next meeting of the Association.

The resolution was adopted.

MR. BEDFORD.—I wish to call the attention of the Association to a new style of prescription balance, designed by Becker & Sons of New York. Its advantage is that all the working parts of the balance, except the pans, are encased, so that they are not exposed to dust or insects, and present no obstruction to the dispenser. The general plan of arrangement of the beam and its attachments is somewhat similar to that of the Beranger balance, but much simpler. Its working is so delicate that it turns readily to the thirtieth of a grain when loaded with five grains or over. Although only a few of them have as yet been made, those who have them in use speak very favorably of them as compared with other prescription balances.

The following papers were read by title and referred to the Executive Committee: On Pharmaceutical Legislation in New Jersey, by James R. Mercein (page 551); Progress of the Metric System, by Frederick Brooks (page 566); How to Improve the Practice of Pharmacy, by R. W. Gardner (page 569); Mortar Practice, by H. T. Cummings (page 588);

Percolation, by Samuel Campbell (page 599); On Syrups prepared by Percolation, by C. W. Holmes (page 607); Alcohol and Mucilage of Acacia, by M. S. Bidwell (page 612); Note on Home-made Pills, by C. W. Holmes (page 619); Unguentum Hydrargyri Nitratis, by Joseph S. Whall (page 635).

**MR. FEHR.**—I demand of the Association the privilege to ask for an explanation of the Proceedings of last year. Will the members present refuse me this privilege? I think it is no more than justice, when a member of the Association thinks something is not right in the Proceedings, it should be brought here, and an explanation be demanded. I wish to state I was invited last year by the Local Committee from Louisville to send to the exhibition there anything that might be of interest to the Association and to pharmacists at large. I did do so. I applied for a place, and I have a card in my possession from the Local Secretary, Mr. Scheffer, in which card he reserves for me a certain place on the table, and says, "Contents noted." Now, I find in the Proceedings the article I sent there was not mentioned, and this, Mr. President and gentlemen of the Association, is an injustice done to me. If I, as a member of the Association, would have known or seen anywhere in the Proceedings anything, or in the constitution, what would be objectionable to sending such an article to the exhibition, I assuredly would have avoided sending it there, and would have avoided to go there myself to take the trouble of leaving my store and going to Louisville; but I thought it would be interesting to the members to see something new produced, for it was something new I produced there at that meeting. That is one point. The next point is, that I had occasion to explain in Louisville, Ky., at the last session of the meeting, the difference between proprietary articles and patented articles. I explained this because, among pharmacists, druggists, and physicians, there prevails a very loose and entirely false idea about patented articles and proprietary articles. This explanation was omitted from our Proceedings. There was assuredly nothing offensive to the Association in my remarks. There was nothing in my remarks that anybody could say I would advertise the article I had in the exhibition, because in all my remarks there was no naming the article I had on exhibition, just the same as I avoid now to name the article.

**THE SECRETARY.**—Here is the official verbatim record of the Proceedings here. If Mr. Fehr can point out a word of his remarks that I have left out, I wish him to do so.

**MR. FEHR.**—These are the words I just repeated here.

**THE SECRETARY.**—That is what the phonographer has taken down, and that is my guide.

**MR. FEHR.**—On this point I produce a letter from the phonographer.

**MR. LILLARD.**—We have not time to prolong this discussion, and, if Mr. Fehr consents, I move that a committee of three be appointed to investigate into the facts of the case (and that Messrs. Hoffmann and Rice, of New York, be two of that committee) to report at the next meeting.

MR. HOFFMANN.—I decline.

MR. SAUNDERS.—This is only a matter of some packages of baby powder, French chalk put up in packages, that this discussion is about. Mr. Fehr misunderstands the proceedings of the Association. It is not customary to print everything everybody says. The matter is left in a certain measure with the Printing Committee to decide as to what may be interesting to the Association. If we printed everything that is said, the volume would be twice as big as now.

MR. BEDFORD.—The remarks were not to the point under discussion. Mr. Fehr took his seat, the point of order being raised that he was out of order.

MR. FEHR.—I beg your pardon for not accepting what Mr. Bedford says, that I was ruled out of order. A gentleman called me to order, but the President did not rule I was out of order. I explained the difference between proprietary articles and patented articles, and there is a difference in them which we and which physicians do not make, and which should be made, because a patented article is by no means a secret article. Patents are open to every one.

The motion of Mr. Lillard to appoint a committee of three on Mr. Fehr's complaints was adopted.

The following resolutions of thanks, offered by Mr. George Leis, were passed:

*Resolved*, That a special and unanimous vote of thanks be tendered by this Association to S. A. D. Sheppard, Joseph Burnett, W. J. Horton, E. H. Doolittle, and others, of the Local Executive Committee, for their valuable services and attention rendered to the members during our sessions here.

*Resolved*, That the thanks of the Association be tendered to the past and present presiding officers for the able and impartial manner in which they have conducted the business.

The President appointed the following committee to consider and report on necessary changes in the By-laws: Charles Bullock, Philadelphia; S. M. Colcord, Boston; and E. P. Nichols, Newark, N. J. (see page 825).

The minutes of the sixth session having been read by the Secretary and approved, the Association, on motion, adjourned to meet again in the city of Philadelphia on the second Tuesday of September, 1876, at 3 o'clock P.M.

JOHN M. MAISCH,  
Permanent Secretary.

844 MINUTES OF THE TWENTY-THIRD ANNUAL MEETING.

After the adjournment of the Association, the following communication was received by the Permanent Secretary:

PHILADELPHIA COLLEGE OF PHARMACY, No. 145 NORTH TENTH STREET,  
PHILADELPHIA, September 1st, 1875.

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION.

GENTLEMEN: The Twenty-fourth Annual Meeting of this Association will be held in Philadelphia during August or September of next year, on which occasion many visitors from various parts of the world (attracted by the International Exposition of 1876) will doubtless be present.

Desirous of making the visit of their professional brethren at that time agreeable, the members of the Philadelphia College of Pharmacy, at their Quarterly Meeting, held June 28th, resolved that a cordial invitation be extended to the members of your honorable Association, to make the College building their headquarters during the International Exposition.

Hoping that we may have the pleasure of welcoming all of you to our city, we have the honor to remain,

With fraternal greetings,

CHARLES BULLOCK,  
Vice-President.

A. B. TAYLOR,  
Corresponding Secretary.

## APPENDIX.

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THE following committees, which were ordered by special resolutions of the Association, were appointed by the President after adjournment:

*Committee on Metrical Weights and Measures.*—Frederick Hoffmann, New York, Chairman; S. P. Sharples, Boston; and Thomas S. Wiegand, Philadelphia.

*Committee of Arrangements for Next Meeting.*—A. W. Miller, Philadelphia, Chairman; J. L. De La Cour and A. P. Brown, Camden; J. W. Worthington, Moorestown, N. J.; and Charles A. Heinitsh, Lancaster, Pa.

*Committee on Letter from Tennessee College of Pharmacy.*—A. L. Calder, Providence, R. I., Chairman; T. Roberts Baker, Richmond, Va.; and Gustavus J. Luhn, Charleston, S. C.

*Committee on Julius Fehr's Complaints.*—William Neergaard, New York, Chairman; James R. Mercein, Jersey City; and Charles L. Eberle, Philadelphia.

It having been found that no action had been taken on the proposed discontinuance of the Committee on the Drug Market, which is a standing committee; and that a reappointment or discontinuance of several special committees, which had been in existence for several years, had not been directed by the Association at its last meeting, the Executive Committee suggested to the President to appoint such committees; and, in response to this advice, the President has made the following appointments:

*Committee on the Drug Market.*—Richard M. Shoemaker, Philadelphia, Chairman; P. W. Bedford, New York; E. Waldo Cutler, Boston; W. H. Brown, Baltimore; and James G. Steele, San Francisco.

*Committee on Adulterations and Sophistications.*—Ottmar Eberbach, Ann Arbor, Mich., Chairman; Joseph P. Remington, Philadelphia; and Louis Dohme, Baltimore.

*Committee on Legislation.*—John M. Maisch, Philadelphia, Chairman; Joseph Roberts, Baltimore; L. E. Sherman, Ludlow, Vt.; Charles H. Dalrymple, Morristown, N. J.; and P. E. Dupuy, Richmond, Va.

*Committee on Liebig Memorial.*—Paul Balluff, New York, Chairman; A. E. Ebert, Chicago; and W. J. M. Gordon, Cincinnati.

*Committee on Photographic Album.*—P. W. Bedford, New York, Chairman; S. A. D. Sheppard, Boston; J. L. Lemberger, Lebanon, Pa.; M. K. Paine, Windsor, Vt.; and James H. Taylor, Newport, R. I.

The Secretary has notified all the above gentlemen of their appointment.

JOHN M. MAISCH,  
Permanent Secretary.

The travelling arrangements made for the twenty-third annual meeting were as follows:

A reduction of fare had been secured from Baltimore and Norfolk, the steamer "William Crane" leaving the former city on Thursday, September 2d, and the latter on the day following, arriving at Boston on the afternoon of Sunday, September 5th. Another party from Philadelphia and vicinity sailed in the steamer "Norman" from Philadelphia on Saturday, September 4th, reaching Boston towards noon on Monday, September 6th. The Fall River Line, by which likewise a reduction from the regular fare had been secured between New York and Boston, brought a large party of members and their families, landing them in Boston on Tuesday morning, about which time, also, many members from the New England States and other sections arrived.

The entertainments provided for the visiting members and their families by the Boston druggists and pharmacists were of a character that their recollection will long be cherished by those who were fortunate enough to participate. On the evening of September 7th a reception was tendered them at the parlors of the St. James Hotel. On Wednesday morning the ladies enjoyed a drive to various places of interest in the suburbs of Boston, and through the handsomely built up part of the city which was burned down some time ago. On the same evening a brilliant levee was given in Arcan's Hall, Odd Fellows' Building, supper being served in the banqueting hall, the exhibition room being likewise kept open.

On Wednesday and Thursday noon, dinner was served to the members in attendance at the sessions in the banqueting hall of the Odd Fellows' Building; and on the evening of Thursday the Boston Theatre was visited to witness Mr. Chanfrau's representation of "Kit the Arkansas Traveller." The rooms of the Orpheus Singing Society were repeatedly visited by many members to spend a few hours in pleasant company.



The harbor excursion on board the steamer "Governor Andrews" took place on Friday afternoon during a heavy rain, which somewhat marred the anticipated pleasure; but, after reaching Downer's Landing, the weather became clear again, and justice was done to the clambake and clam chowder; after which, dancing was enjoyed by many, until the time for returning to the city arrived.

On Saturday morning many returned to their homes. But about sixty of the party participated in the trip to the White Mountains under the guidance of Mr. Sheppard. Dinner was served at North Conway, which was reached by rail about two o'clock, and commodious stage-coaches conveyed the party to the Glen House, beautifully situated at the foot of Mount Washington, the top of which is 6288 feet above the sea. After a visit to Glen Ellis Falls, the Garnet Pool, and other interesting points, the ascent of Mount Washington was made in coaches on Sunday afternoon. The gradual increase of pines and firs in the forest; the diminishing vegetation, leaving for a considerable portion beneath the summit merely mosses and lichens; the gradual decrease of the temperature to below the freezing-point; the passage, when nearing the top, through a wind storm, having a velocity of forty miles an hour; the fleeting and gradually increasing clouds, through which the surrounding mountains and valleys, and even the distant ocean could still be seen; all this was of unusual interest; still the hospitable door of Mount Washington Summit House was a welcome sight to all after this four hours' trip. During the evening the clouds thickened and settled deeper in the valley, leaving the neighboring peaks bare, and affording, in the bright moonlight, a seemingly boundless view upon an endless sea of rolling clouds about 1500 feet beneath, interrupted only by the huge peaks of Mounts Jefferson, Adams, Madison and others, towering above the clouds; while the moon, enveiled by passing clouds, was frequently encircled with the bright colors of the rainbow. The old "Tiptop House," the new hotel, and the Government Signal Station, all of which are securely fastened by chains to the solid mountain; the grotesque configurations of the rocks; the absence of almost all vegetation, and the occasional glimpses in the distance through the clouds on the west side of the mountain, were places and sights of interest.

The descent was made on Monday morning by the steeply inclined Mount Washington Railway through thick clouds; but, after the base was reached, the weather became clear, and the journey was continued in stages past the Ammonoosuc Falls and Fabyan's to the Crawford House, located in a pleasant valley, near the gate of the White Mountain Notch; besides which, also, Mount Willard, with Hitchcock's Flume, the Willey House, Idlewild, several picturesque cascades, and curious rock formations were visited. Here the company separated on Tuesday, one party, in charge of Mr. Colcord, passing through the Franconia Mountains to Lake Winnipiseogee; while the other, returned by rail *via* North Conway to Boston, many meeting again on board the Fall River boat on their trip to New York and homeward.

A party of ten spent some days on the Isle of Shoals; while others extended their journey to Lake George, the Hudson River, or Niagara Falls.

JOHN M. MAISCH,  
Recording Secretary.

## LIST OF SOCIETIES, LIBRARIES, JOURNALS, AND INDIVIDUALS,

*To whom complimentary copies of the Proceedings of this Association are forwarded.*

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The State Libraries of all the States of the Union except Connecticut.		
Maine Pharmaceutical Association,	Portland,	Maine.
Bowdoin College,	Brunswick,	"
Dartmouth College,	Hanover,	New Hampshire.
Amherst College,	Amherst,	Massachusetts.
Harvard University,	Cambridge,	"
Massachusetts College of Pharmacy,	Boston,	"
American Academy of Arts and Sciences,	"	"
City Library,	"	"
City Hospital,	"	"
Boston Athenæum,	"	"
Vermont Pharm. Ass'n, A. W. Higgins, Sec.,	Rutland,	Vermont.
University of Vermont,	Burlington,	"
Brown University,	Providence,	Rhode Island.
Trinity College,	Hartford,	Connecticut.
Yale College,	New Haven,	"
College of Pharmacy of the City of N. Y.,	New York,	New York.
Literary and Scientific Society of German		
Apothecaries,	"	"
American Druggists' Circular,	"	"
American Chemist,	"	"
Journal of Applied Chemistry,	"	"
Astor Library,	"	"
Mercantile Library,	"	"
Long Island Historical Society,	Brooklyn,	"
Camden Pharmaceutical Association,	Camden,	New Jersey.
Philadelphia College of Pharmacy,	Philadelphia,	Pennsylvania.
College of Physicians,	"	"
Pennsylvania Hospital,	"	"
Academy of Natural Sciences,	"	"
American Philosophical Society,	"	"
Philadelphia Library,	"	"
Mercantile Library,	"	"
American Journal of Medical Sciences,	"	"
Dental Cosmos,	"	"

# **SOCIETIES TO WHOM PROCEEDINGS ARE FORWARDED. 849**

Maryland College of Pharmacy,	Baltimore,	Maryland.
University of Maryland,	"	"
Maryland Academy of Sciences,	"	"
Smithsonian Institution,	Washington,	Dist. Columbia.
Congressional Library,	"	"
Surgeon-General, U. S. Army,	"	"
Department of Agriculture,	"	"
National College of Pharmacy,	"	"
Richmond Pharmaceutical Association,	Richmond,	Virginia.
Med. Soc. of Virginia, L. B. Edwards, M.D., Secretary,	"	"
South Carolina Medical Association, Dr. H. D. Fraser, Secretary,	Charleston,	South Carolina.
Tennessee College of Pharmacy,	Nashville,	Tennessee.
Louisville College of Pharmacy,	Louisville,	Kentucky.
Kentucky State Medical Society, Dr. J. A. Larrabee, Secretary,	"	"
Cincinnati College of Pharmacy,	Cincinnati,	Ohio.
Cincinnati Academy of Medicine,	"	"
Detroit Review of Medicine and Pharmacy,	Detroit,	Michigan.
University of Michigan,	Ann Arbor,	"
Chicago College of Pharmacy,	Chicago,	Illinois.
Illinois State Medical Society,	"	"
St. Clair Pharmaceutical Association of Southern Illinois,	Belleville,	"
Minnesota State Medical Society, Charles E. Smith, M.D., Secretary,	St. Paul,	Minnesota.
St. Louis College of Pharmacy,	St. Louis,	Missouri.
St. Louis Academy of Science,	"	"
St. Louis Mercantile Library,	"	"
St. Louis Public School Library,	"	"
California Pharmaceutical Society,	San Francisco,	California.
Pacific Medical and Surgical Journal,	"	"
Montreal Chemists' Association,	Montreal,	Canada.
Canadian Pharmaceutical Society,	Toronto,	"
Pharmaceutical Association of Quebec.		
British Pharmaceutical Conference, Dr. J. Attfield, London.		
Pharmaceutical Society of Great Britain.		
Pharmaceutical Journal and Transactions, London.		
Chemical News, London.		
Chemist and Druggist, London.		
Journal of Applied Science, London.		
British Museum, London.		
Philosophical Society, Glasgow.		
Liverpool Chemists' Association.		
Association of Chemists and Druggists, Wolverhampton.		
Pharmaceutical Society at Edinburgh.		

**850 SOCIETIES TO WHOM PROCEEDINGS ARE FORWARDED.**

Academie Royale de Médecine, Bruxelles.  
Société de Pharmacie Royale de Bruxelles.  
Société Royale des Sciences Médicales et Naturelles, Bruxelles.  
Société de Pharmacie d'Anvers, Fr. Vaudelt, Secrétaire.  
Société de Pharmacie, M. Henri Buignet, Secrétaire, Paris.  
Academie des Sciences, Paris.  
L'Union Pharmaceutique.  
Répertoire de Pharmacie, Paris.  
Schweizerische Wochenschrift für Pharmacie, C. W. Stein, St. Gallen.  
Oesterreichischer Apotheker-Verein, Wien.  
Oesterreichische Zeitschrift für Pharmacie, Wien.  
K. Gesellschaft der Aerzte, Dr. Hauke, Secretary, Wien.  
K. Akademie der Wissenschaften, Wien.  
K. Bayer, " " München.  
Neues Repertorium für Pharmacie, Prof. Buchner, München.  
University of Strassburg.  
Deutscher Apotheker-Verein.  
Archiv der Pharmacie, Waisenhausbuchhandlung, Halle.  
Chemisches Centralblatt, Dr. Rud. Arendt, Leipzig.  
Prof. Dr. Wiggers, Göttingen.  
Prof. Dr. Wöhler, Göttingen.  
K. Akademie der Wissenschaften, Göttingen.  
Pharmaceutische Centralhalle, Dr. H. Hager, Pulvermühle bei Fürstenberg.  
Pharmaceutische Zeitung, Bunzlau.  
Pharmaceutische Gesellschaft in St. Petersburg, St. Petersburg.  
Pharmaceutisches Institut, Dorpat, Russia.  
Pharmaceutical Institution, Stockholm, Sweden.  
Kongelige Norske Universitet i Christiania.  
Archiv for Pharmaci, S. M. Trier, Kjobenhavn.

## LIST OF PUBLICATIONS RECEIVED,

*For the American Pharmaceutical Association.*

Societies and editors are respectfully requested to forward all publications intended for the American Pharmaceutical Association to the Permanent Secretary. European exchanges, if not sent by mail, will reach us through the Smithsonian Institution at Washington.

JOHN M. MAISCH,  
145 North Tenth Street, Philadelphia, Pa.

- American Journal of Medical Sciences, Philadelphia, 1875.  
Medical News and Library, Philadelphia, 1875.  
Dental Cosmos, Philadelphia, 1875.  
American Chemist, New York, 1875.  
The Laboratory, Boston, 1875.  
Review of Medicine and Pharmacy, Detroit, 1875.  
The Pharmacist, Chicago, 1875.  
Pacific Medical and Surgical Journal, San Francisco, 1875.  
The Canadian Pharmaceutical Journal. Edited by E. B. Shuttleworth, 1875.  
Pharmaceutical Journal and Transactions, London, October, 1874, to September, 1875.  
Yearbook of Pharmacy and Transactions of the British Pharmaceutical Conference, 1875.  
The Chemist and Druggist, London, 1875.  
The Chemists' and Druggists' Diary, 1876.  
Bulletin de la Société Royale de Pharmacie de Bruxelles, 1875.  
Buchner's Neues Repertorium, München, 1875.  
Nachrichten von der K. Gesellschaft der Wissenschaften, etc. Göttingen, 1874.  
Pharmaceutische Centralhalle, Berlin, 1875.  
Archiv der Pharmacie, Halle, 1875.  
Zeitschrift des allgemeinen oesterreichischen Apotheker-Vereines. Wien, 1875.  
Anzeiger der K. Akademie der Wissenschaften. Wien, 1875.  
Schweizerische Wochenschrift für Pharmacie, 1874, 1875.  
Statutes of the Province of Quebec, 88 Victoria, 1875.  
Proceedings of the American Academy of Arts and Sciences, Boston, i-x.  
Proceedings of the Philosophical Society of Glasgow, vol. ix, No. 2.  
Bericht über den vierten internationalen Congress Pharmaceutischer Vereine und Gesellschaften zu St. Petersburg.  
Transactions of the State Medical Society of Virginia, 1874.  
Transactions of the Kentucky State Medical Society, 1874. Nineteenth annual session.

Transactions of the Illinois State Medical Society, 1874. Twenty-fourth annual session.

Transactions of the South Carolina Medical Association, 1875. Fifth annual session.

Transactions of the Minnesota State Medical Society, 1875.

Annual Report of the Mercantile Library Company of Philadelphia, January, 1875.

Annual Report of the Trustees of the Astor Library Company of the city of New York, January, 1875.

Annual Report of the Health Officer (H. Gibbons, M.D.) of the city and county of San Francisco, 1875.

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## AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

*Nominated by the Treasurer and Permanent Secretary, and approved by the President, to carry out the resolution passed at the fifth session of the 18th Annual Meeting.*

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<i>California,</i>	James G. Steele, 521 Montgomery St.,	San Francisco.
<i>Dist. of Columbia,</i>	John Alex. Milburn,	Washington.
<i>Delaware,</i>	Linton Smith, M.D., 7th & Market Sts.,	Wilmington.
<i>Illinois,</i>	Henry W. Fuller, 24 Market St.,	Chicago.
<i>Kansas,</i>	Robert J. Brown, Fifth & Shawnee Sts.,	Leavenworth.
<i>Kentucky,</i>	C. Lewis Diehl, First & Walnut Sts.,	Louisville.
<i>Louisiana,</i>	John H. Pope, Jackson & Prytania Sts.,	New Orleans.
<i>Maryland,</i>	J. Faris Moore, Howard & Madison Sts.,	Baltimore.
<i>Massachusetts,</i>	Samuel M. Colcord, Tremont Street,	Boston.
<i>Michigan,</i>	William Johnson, 153 Jefferson Av.,	Detroit.
<i>Missouri,</i>	William H. Crawford, 782 Washington Av.,	St. Louis.
<i>New Jersey,</i>	Charles B. Smith, 831 Broad St.,	Newark.
<i>New York,</i>	Daniel C. Robins, 91 Fulton St.,	New York.
	George O. Close, Smith & Schermerhorn,	Brooklyn.
<i>Ohio,</i>	Alfred C. Hill, Fourth & Smith Sts.,	Cincinnati.
<i>Pennsylvania,</i>	Rich'd M. Shoemaker, Fourth & Race Sts.,	Philadelphia.
	James B. Cherry, 23 Fourth Av.,	Pittsburg.
<i>South Carolina,</i>	Gustavus J. Luhn,	Charleston.
<i>Tennessee,</i>	Henry C. Steever, 2d & Madison Sts.,	Memphis.
<i>Virginia,</i>	T. Roberts Baker, Main Street,	Richmond.

**CONSTITUTION AND BY-LAWS**

**OF THE**

**AMERICAN PHARMACEUTICAL ASSOCIATION.**

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**CONSTITUTION.**

**ARTICLE I.** This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacutists and Druggists of the United States in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulteration.

2. To encourage proper relations between Druggists, Pharmacutists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing, and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

**ARTICLE II.** This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

**ARTICLE III.** The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors.

**ARTICLE IV.** All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

**ARTICLE V.** Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting; when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

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## BY-LAWS.

### CHAPTER I.

#### *Of the President and Vice-Presidents.*

**ARTICLE I.** The President shall preside at all meetings of the Association; in his absence or inability, one of the Vice-Presidents, or in the absence of all, a President pro tempore shall perform the duties of President.

**ARTICLE II.** In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary pro tempore.

**ARTICLE III.** In meetings the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports, and communications, and order the vote upon all proper questions at the proper time.

**ARTICLE IV.** In all ballotings, and on questions upon which the yeas and nays are taken, the President is required to vote, but his name should be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal, and in case of such equal division the motion is lost.

**ARTICLE V.** He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality or impropriety he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in cases where he prefers to submit the matter to the meeting; decide promptly who is to speak when two or more members rise at the same moment; and be careful to see that business is brought forward in proper order.

**ARTICLE VI.** He shall have the right to call a member to the chair, in order that he may take the floor, in debate. He shall see that the Constitution and By-laws are properly enforced.



ARTICLE VII. He shall appoint all committees, unless provided for in the By-laws, or otherwise directed by the Association.

ARTICLE VIII. He shall sign the certificates of membership, and counter-sign all orders on the Treasurer. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE IX. He shall present at each annual meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

## CHAPTER II.

### *Of the Permanent Secretary.*

ARTICLE I. The Permanent Secretary shall be elected to hold office permanently, during the pleasure of the Association. He shall receive from the Treasurer an annual salary of \$600, and the amount of his expenses incident to the meeting in addition to his salary.

ARTICLE II. He shall preserve fair and correct minutes of the proceedings of the meetings, and carefully preserve, on file, all reports, essays, and papers of every description received by the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Executive Committee.

ARTICLE III. He shall read all papers handed him by the President for that purpose; shall call and record the yeas and nays whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act; and shall notify every member of the time and place of each annual meeting.

ARTICLE IV. He shall be, ex-officio, a member of the Executive Committee.

## CHAPTER III.

### *Of the Local Secretary.*

ARTICLE I. The Local Secretary shall be elected annually, near the close of the Annual Meeting, and shall reside at or near the place where the next Annual Meeting of the Association is to be held.

ARTICLE II. He shall assist the Permanent Secretary in his duties; shall co-operate with any local committee in making arrangements for the Annual Meeting; shall correspond with the chairman of the several committees, and with other members, in advance of the meeting, for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

## CHAPTER IV.

*Of the Treasurer.*

**ARTICLE I.** The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

**ARTICLE II.** He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

**ARTICLE III.** He shall report to the Executive Committee, previous to each Annual Meeting, the names of such members as have failed to pay their annual contributions for three years, and also the names of such as have failed to return their certificates of membership after having been officially disconnected with the Association, and having been duly notified to return them.

**ARTICLE IV.** He shall present a statement of his accounts at each Annual Meeting, that they may be audited; he shall receive an annual salary of \$400, and the amount of his expenses incident to the meeting in addition to his salary.

## CHAPTER V.

*Of the Reporter on the Progress of Pharmacy.*

**ARTICLE I.** The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services such sum as may be annually determined upon.

**ARTICLE II.** All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the Permanent Secretary for preservation.

**ARTICLE III.** From these and other available sources he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry, and Materia Medica, and the collateral branches of knowledge: on the changes in condition of Pharmaceutical Institutions, together with such statistical, biographical, and obituary notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries at home and abroad.

**ARTICLE IV.** The report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted, shall be written in a form fitted for the printer, and shall be presented complete at the annual meeting.

**ARTICLE V.** In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Executive Committee shall be required to make the best arrangements they can command, to continue the work to its completion.

CHAPTER VI.

*Of Committees.*

**ARTICLE I.** There shall be elected annually four standing committees: An Executive Committee, and a Committee on the Drug Market, each to consist of five members; a Committee on Papers and Queries, and a Business Committee, each to consist of three members.

**ARTICLE II.** The Executive Committee, of which the Permanent Secretary shall be a member, shall have charge of the revision of the Roll, the investigation of application for membership, and the publication of the Proceedings.

**ARTICLE III.** They shall report at each meeting a revised roll of members, with appropriate notices of deceased members, and the names of any who, having become disconnected with the Association, refuse to return their certificates of membership as provided by the By-Laws.

**ARTICLE IV.** They shall furnish to each member of the Association not in arrears one copy of the annual publication of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sittings, the Reports of the President and of the Committees, together with such addresses, scientific papers, discussions, notices of new processes, and preparations, as the Executive Committee may deem worthy of insertion, and shall fix the price at which the Proceedings shall be sold.

**ARTICLE V.** The Committee on the Drug Market shall report annually the condition of the Drug Market, the fluctuations in the supply and demand of drugs and chemicals, the variations in quality, and the adulterations and sophistications coming under their observation or reported to them by others, with any suggestions or recommendations for the improvement or better regulation of the trade; and they shall be authorized to report upon any adulterations and sophistications of immediate interest, through the Pharmaceutical Journals, as soon as practicable after their discovery.

**ARTICLE VI.** The Committee on Papers and Queries shall receive all Reports of Standing Committees, and all papers for the Association. They shall designate which of them shall be read at length, or which by title, and shall be furnished with a synopsis of each by the authors. They shall, in connection with the Business Committee, arrange the time which may be most appropriate or convenient for reading them.

**ARTICLE VII.** The Committee on Papers and Queries shall report, near the close of each Annual Meeting, a proper number of questions of scientific and practical interest, the answers to which may advance the interests of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

**ARTICLE VIII.** Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same with a synopsis of its contents to the Committee on Papers and Queries previous to the third session.

**ARTICLE IX.** It shall be the duty of every Standing Committee making a report annually to the Association, in like manner to furnish a copy of the same, together with a synopsis of its contents, to the Committee on Papers and Queries, before the first annual session of the Association.

**ARTICLE X.** The Business Committee shall be charged with the transmission of unfinished business from one Annual Meeting to another, and with collecting, arranging, and expediting the business during the sessions of the Annual Meetings.

## CHAPTER VII.

### *Of Membership.*

**ARTICLE I.** Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry, and Botany, who may be specially interested in Pharmacy and *Materia Medica*, who, after duly considering the objects of the Association and the obligations of its Constitution and By-Laws, are willing to subscribe to them, are eligible to membership.

**ARTICLE II.** Any person eligible to membership may make application in writing, with the indorsement of any two members of the Association in good standing, to any member of the Executive Committee, who shall report his application to the said Committee.

If after investigating his claims they shall approve his election, they shall, at the earliest time practicable, report his name to the Association, and he may be elected by two-thirds of the members present on ballot.

**ARTICLE III.** No person shall be a member of this Association, nor shall his name be placed upon the roll, until he shall have signed the Constitution and paid into the Treasury the sum of *Five Dollars* as an initiation fee, and the annual contribution for the current year, with the exception of *Delegates*, as provided in Article VI of this chapter.

**ARTICLE IV.** Every member shall pay in advance to the Treasurer the sum of *Five Dollars* as his yearly contribution, and is liable to lose his membership by neglecting to pay said contribution for *three successive years*.

**ARTICLE V.** Any member who shall pay to the Treasurer the sum of *Seventy-five Dollars at one time*, shall become a life member and shall be exempt from all future annual contributions.

**ARTICLE VI.** All local organizations of Pharmacists shall be entitled to *five delegates*, as their representatives in the Annual Meetings, who, *if present*, become members of the Association on signing the Constitution and paying the annual contribution for the current year, without paying the usual initiation fee.

**ARTICLE VII.** Members shall be entitled, on the payment of *Five Dollars*, to receive a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and Treasurer, at the same time covenant-

ing to return the same to the proper officer on relinquishing their connection with the Association.

**ARTICLE VIII.** Persons constitutionally elected to membership become permanent members, and their membership can cease only by resignation, non-payment of dues, or by expulsion, as provided in these By-Laws.

**ARTICLE IX.** Resignation of membership shall be made in writing to the Permanent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported at the next Annual Meeting.

**ARTICLE X.** Any member may be expelled for improper conduct or the violation of the Constitution, By-Laws, or Ethics adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at some regular session.

**ARTICLE XI.** Pharmacutists, chemists, and other scientific men, who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office, or vote at the meetings.

## CHAPTER VIII.

### *Of Meetings.*

**ARTICLE I.** The meetings shall be held annually; provided, that in case of failure of this from any cause the duty of calling the Association together shall devolve upon the President or one of the Vice-Presidents, with the advice and consent of the Executive Committee.

**ARTICLE II.** The order of business at the first session of each Annual Meeting shall be as follows:

*Section 1.* Promptly, at the time named in the notice issued for the meeting, the President, or in his absence one of the Vice-Presidents, or in their absence a President pro tempore, shall officiate.

*Section 2.* In the absence of the Permanent Secretary the President shall appoint a Recording Secretary pro tempore, who shall perform the duties of the Permanent Secretary until his arrival.

*Section 3.* Nineteen members shall constitute a quorum for the transaction of business.

*Section 4.* The President shall appoint a committee of three persons to examine the credentials of delegates, which committee shall attend to that duty. The President's address may then be read, after which the committee shall report to the Association as soon as practicable, when the Secretary shall call the roll, noting the names of the delegates and members in attendance.

*Section 5.* The Executive Committee shall present names recommended for membership, when the President, having ascertained that a quorum of members is present, shall order an election by ballot, and appoint two tellers.

*Section 6.* Reports of committees shall be presented, read by their titles, the synopsis, or in full, and laid on the table for future consideration.

*Section 7.* The President shall call the roll of Colleges and Associations represented, requesting each delegation in turn to appoint one member, the persons so selected to act as a committee to nominate officers and the Standing Committees for the ensuing year; in addition to which he shall appoint five members, who are not delegates, to act with the committee.

*Section 8.* The reports of the Executive Committee, of the Permanent Secretary, and of the Treasurer, shall be read by title or in full.

*Section 9.* A committee of five shall be appointed to examine and report upon specimens exhibited.

*Section 10.* Incidental business may be called up by the Business Committee.

**ARTICLE III.** The order of business at the second session of each Annual Meeting shall be as follows:

*Section 1.* The President shall call the Association to order.

*Section 2.* The Secretary shall read the minutes of the preceding meeting, which may be amended if necessary, and shall then be approved.

*Section 3.* The Report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the Officers and Committees nominated shall be balloted for.

*Section 4.* The officers elected shall take their respective places.

*Section 5.* The Executive Committee shall present names recommended for membership, when a ballot shall be ordered for their election.

*Section 6.* Reports of Standing Committees shall be read.

*Section 7.* Reports of Special Committees shall be read.

*Section 8.* The second session shall close with the examination of specimens on exhibition.

**ARTICLE IV.** The order of business at subsequent sessions shall be determined by the Business Committee, with the consent of the Association.

## CHAPTER IX.

### *Of Rules of Order and Debate.*

**ARTICLE I.** The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

**ARTICLE II.** When a question is regularly before the meeting and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order in which they are arranged. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

## CHAPTER X.

### *Miscellaneous.*

ARTICLE I. In all such points of order as are not noticed in these By-Laws the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-Laws shall be submitted in writing, and may be balloted for at any subsequent session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-Laws.

ARTICLE III. No one or more of these By-Laws shall be suspended.

**FORM OF APPLICATION FOR MEMBERSHIP.**

APPROVING of the objects of the American Pharmaceutical Association, I am desirous of joining it in membership; and having read its Constitution and By-laws, I hereby signify my approval of the same, and subscribe to them.

.....  
Address, .....

I hereby agree to return my certificate of membership in the American Pharmaceutical Association to the Treasurer of that body, if I shall hereafter cease to be connected in membership with it.

.....  
**TESTIMONIALS.**

The undersigned, members in good standing, being personally acquainted with \_\_\_\_\_ of \_\_\_\_\_ testify to his moral character, his skill as a practical Druggist and Pharmaceutist, and his professional probity and good standing, and they recommend him for membership in the American Pharmaceutical Association.

**NAME.**

**ADDRESS.**



# ROLL OF MEMBERS.

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## HONORARY MEMBERS.

### UNITED STATES OF AMERICA.

Daniel B. Smith,	Philadelphia,	Penna.,	1856
George B. Wood, M.D.,	"	"	1857

### FOREIGN COUNTRIES.

#### AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

#### BELGIUM.

A. T. De Meyer, *Brussels*, 1868.      Norbert Gille, *Brussels*, 1868.

#### ENGLAND.

Dr. John Attfield, *London*, 1871.      Henry B. Brady, *Newcastle-on-Tyne*, 1871.  
Dr. Robert Bentley, *London*, 1872.      Dr. J. Redwood, *London*, 1871.

#### FRANCE.

Dr. A. Chevalier, *Paris*, 1871.      Dr. Augustin A. Delondre, *Stores*, 1871.  
Dr. J. Léon Soubeiran, *Montpellier*, 1871.      Stanislas Martin, *Paris*, 1872.

#### GERMANY.

Dr. Adolph Duflos, *Breslau*, 1871.      Dr. F. A. Flückiger, *Strasburg*, 1868.  
Dr. Hermann Hager, *Pulvermühle near Fürstenberg*, 1868.      Dr. Frederick Mohr, *Bonn*, 1868.  
Dr. G. C. Wittstein, *Munich*, 1868.

#### NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

#### RUSSIA.

Dr. G. Dragendorff, *Dorpat*, 1868.

## ACTIVE MEMBERS.

Members are requested to notify the Secretary and Treasurer of all changes of address.

(The names of life members in SMALL CAPITALS. Names of life members under the old Constitution in *italics*.)

## UNITED STATES OF AMERICA.

## ALABAMA.

*Mobile.*

Candidus, Philip Charles, . 1857  
 Mohr, Charles, . . . 1871  
 Primo, Manuel, . . . 1868  
 Punch, William F., . . 1874

*Selma.*

McVoy, James L., . . . 1871  
 Wilkins, John D., . . . 1871

## ARKANSAS.

*Hot Springs.*

Rockafellow, Charles N., . 1873

*Little Rock.*

Beidelman, John Wilmer, . 1871  
 McAlmont, John J., . . 1871  
 Naulty, William H., . . 1870

## CALIFORNIA.

*San Francisco.*

Calvert, John, . . . 1870  
*Moffitt, Thomas S.*, . . 1861  
 Painter, Emlen, . . . 1870  
 Simpson, William, . . . 1870  
*Steele, Henry*, . . . 1859  
 Steele, James G., . . . 1859  
 Wenzell, William T., . . 1870

*Eureka, Humboldt Bay.*

McKay, George J., . . . 1864

*Marysville, Yuba Co.*

Flint, John Henry, . . . 1873

*Vallejo, Solano Co.*

Frost, James, . . . 1870  
 Topley, James, . . . 1869

## COLORADO.

*Central City.*

Best, John, . . . 1866

*Del Norte, Conejos Co.*

Cheney, Judson Rollin, . . 1868

*Denver.*

Covell, Thomas Jefferson, . 1864

## COLUMBIA, DISTRICT OF.

*Georgetown.*

Becker, Charles, . . . 1875

*Washington.*

Baldus, William Theodore, . 1872  
*Bannwart, Charles A.*, . . 1856  
 Bury, Edward Berkley, . . 1870  
 Christiani, Charles, . . . 1874  
 Cristiani, Theodore, . . . 1873  
 Cromwell, Zachariah William, 1870  
 Entwisle, William Burton, . 1873  
 Ferguson, Robert Benedict, . 1867  
 Gaither, Francis Singleton, . 1860  
 Heller, Peter Henry, . . . 1871  
 Hickling, Daniel Percy, . . 1867  
 Howard, George Montgomerie, 1871  
 Kidwell, John Lawrence, . . 1856  
 Lewis, Samuel Edwin, . . . 1875  
 Major, John Richards, . . . 1873  
 Milburn, John Alexander, . . 1858  
 O'Donnell, James Dominic, . 1870  
 Oldberg, Oscar, . . . 1873  
 Simms, Giles Green Craycroft, 1860  
 Taber, Edward Morris, . . . 1874  
 Thompson, William Scott, . . 1871  
*Tyson, Samuel Ellicott*, . . 1857

## CONNECTICUT.

*Hartford.*

Goodrich, Stephen, . . . 1875  
 Goodwin, Lester H., . . . 1875  
 Lambe, John J., . . . 1868  
 Wells, John C., . . . 1875  
 Williams, John K., . . . 1875

*Litchfield.*

Gates, Howard E., . . . 1878

*Middletown.*

Pitt, John R., Jr., . . . 1872

*Naugatuck.*

May, James O., . . . 1875

*New Haven.*

Daggett, Alfred, Jr., . . . 1865  
 Daggett, Henry, . . . 1871  
 Kelsey, Henry, Jr., . . . 1873

*Norwich.*

Osgood, Hugh H., . . . 1875  
 Sevin, N. Douglass, . . . 1875

*Stamford.*

Haight, William B., . . . 1872  
 Morrison, Samuel C., . . . 1871

*Wallingtonford.*

Pickford, Thomas, . . . 1875

*Waterbury.*

Dikeman, Nathan, . . . 1859  
 Munson, Luzerne J., . . . 1872

*West Winstead.*

Phelps, Dwight, . . . 1873

*Windsor Locks.*

Holden, Henry Clay, . . . 1870

## DAKOTA TERRITORY.

*Yankton.*

Eyster, Christopher Edward, . . . 1871

## DELAWARE.

*Wilmington.*

McInall, Edward, Jr., . . . 1867

Shoemaker, Benjamin, . . . 1867

Smith, Linton, . . . 1870

## FLORIDA.

*Fort George.*

Rollins, John Francis, . . . 1859

*Monticello.*

Palmer, John Dabney, . . . 1875

## GEORGIA.

*Atlanta.*

Daniels, John B., . . . 1871

Peacock, Frederick S., . . . 1871

Schumann, Theodore, . . . 1860

*Augusta.*

Chapman, Foster S., . . . 1875

Land, Robert H., . . . 1859

Tarrant, Homer Post, . . . 1875

*Macon.*

Zeilin, John Henry, . . . 1859

*Milledgeville.*

Clark, John M., . . . 1857

Grieve, Fleming G., . . . 1859

Cotting, William A., . . . 1869

*Rome.*

Fenner, William R., . . . 1871

## ILLINOIS.

*Belleville.*

Steingoetter, Henry, . . . 1871

*Bloomington.*

Dyson, Dunbar S., . . . 1856

*Bradford, Stark Co.*

Plummer, David G., . . . 1869

*Champaigne.*

Day, Charles W., . . . 1873

*Chicago.*

Bartlett, Nicholas Gray, . . . 1864

Biroth, Henry, . . . 1865

Blocki, William F., . . . 1868

Borchardt, Julius C., . . .	1867	<i>Peoria.</i>	
Buck, George, . . .	1860	Singer, Peter J., . . .	1869
Ebert, Albert Ethelbert, . . .	1864	<i>Quincy.</i>	
Fox, Daniel S., . . .	1872	Schroder, Hermann, . . .	1871
Fredigke, Charles Christian, . . .	1869		
Fuller, Henry W., . . .	1865	<b>INDIANA.</b>	
Fuller, Oliver F., . . .	1869	<i>Evansville.</i>	
Gale, Edwin O., . . .	1857	Lilly, James E., . . .	1872
Gale, William H., . . .	1857	<i>Fort Wayne.</i>	
Garrison, Herod Daily, . . .	1869	Hisner, Henry O. W., . . .	1874
Heuermann, Henry W., . . .	1869	<i>Indianapolis.</i>	
Holt, Alvin E., . . .	1878	Dryer, James W., . . .	1871
Hooper, John H., . . .	1865	Miller, Edward T., . . .	1859
Jacobus, Judson S., . . .	1870	Schrader, Henry, . . .	1869
Jamieson, Thomas N., . . .	1869	Sloan, George W., . . .	1857
Jauncey, William, . . .	1878	<i>Kendallville.</i>	
Mahla, Frederick, . . .	1864	Lohman, George H., . . .	1872
McPherson, George, . . .	1865	<i>Lawrenceburgh.</i>	
Mill, James W., . . .	1864	Ferris, Charles E., . . .	1874
Milleman, Philip Lionel, . . .	1866	<i>Logansport.</i>	
Paine, James D., . . .	1857	Dale, Frank C., . . .	1874
Palmer, Hosea W., . . .	1870	<i>Madison.</i>	
Parsons, John, . . .	1865	Harper, Frank M., . . .	1874
Patterson, Theodore H., . . .	1869	<i>New Albany.</i>	
Reinhold, William, . . .	1866	Scribner, Benjamin Franklin, . . .	1858
Sargent, Ezekiel Herbert, . . .	1864	<i>Terre Haute.</i>	
Sharp, J. Perine, . . .	1865	Buntin, William C., . . .	1874
Smith, Albert A., . . .	1869		
Strehl, Louis C., . . .	1866	<b>IOWA.</b>	
Sweet, Henry, . . .	1865	<i>Davenport.</i>	
Whitfield, Thomas, . . .	1865	Ballard, John W., . . .	1871
Willard, Joseph, . . .	1865	<i>Dubuque.</i>	
Wilson, Julius H., . . .	1869	Ruete, Theodore W., . . .	1870
Woltersdorf, Louis, . . .	1865	<i>Fort Madison.</i>	
<i>Englewood, Cook Co.</i>		Schaefer, George H., . . .	1871
Peirpoint, Newton, . . .	1869	<i>Washington.</i>	
<i>Galesburg.</i>		Cook, William A., . . .	1871
Clark, Albert B., Jr., . . .	1868	Ink, Parker P., . . .	1872
Devendorf, Almond Smith, . . .	1872		
<i>Highland.</i>			
Mueller, Adolphus, . . .	1871		
<i>Mascoutah.</i>			
Henrich, George, . . .	1875		
<i>Okawville, Washington Co.</i>			
Streit, Alexander G. F., . . .	1874		

**KANSAS.**

*Fort Scott.*

Ingalls, Albert O., . . . 1869

*Lawrence.*

Leis, George, . . . 1869

*Leavenworth.*

Brown, Robert J., . . . 1862

Harrop, Joseph W., . . . 1869

Parham, Robert, . . . 1868

Pettit, Henry M., . . . 1860

**KENTUCKY.**

*Catlettsburg.*

Patton, William Allison, . . . 1878

*Covington.*

Nodler, Peter, . . . 1870

Zwick, George Gilbert, . . . 1874

*Frankfort.*

Averill, William Henry, . . . 1874

*Lexington.*

Frost, John J., . . . 1874

Richardson, Marius D., . . . 1874

*Louisville.*

Bell, Gotthard Emmanuel, . . . 1874

Carey, George Hamet, . . . 1866

Colgan, John, . . . 1867

Davis, Vincent, . . . 1874

Diehl, Conrad Lewis, . . . 1868

Huddart, John Fletcher, . . . 1870

*Hughes, Henry Arnold,* . . . 1857

Jones, Simon Newton, . . . 1870

Kielhorn, Henry, . . . 1874

Lingelbach, Ferdinand, . . . 1874

McAfee, James Alexander, . . . 1874

Miller, Frederick Christopher, . . . 1874

Mobley, Cyrus Lyman, . . . 1874

Newman, George Abner, . . . 1866

Peter, Arthur, . . . 1874

Pfingst, Edward Charles, . . . 1874

Pfingst, Ferdinand John, . . . 1867

Pfingst, Henry Adolph, . . . 1874

Rogers, Wiley, . . . 1874

Scheffer, Emil, . . . 1872

Schmidt, William George, . . . 1874

Strassel, William, . . . 1870

Sutton, Ellsworth Septimus, . . . 1871

Sutton, Peter Priest, . . . 1871

Wilder, Graham, . . . 1868

**LOUISIANA.**

*New Orleans.*

Bugge, Andreas Valdemar, . . . 1868

Keffer, William P., . . . 1866

Lyons, Isaac L., . . . 1875

Pope, John H., . . . 1860

*Bayou Goula.*

Viallon, Paul L., . . . 1870

*New Iberia.*

Lee, James A., . . . 1856

*Plaquemine.*

Delavallade, John M., . . . 1878

*Thibodeaux.*

Thibodeaux, Joseph G., . . . 1870

*Vidalia.*

Schaaf, Justus Henry, . . . 1875

**MAINE.**

*Augusta.*

Partridge, Charles K., . . . 1867

*Bangor.*

Harlow, Noah Sparhawk, . . . 1859

Patten, John F., . . . 1871

*Biddeford.*

Boynton, Herschell, . . . 1875

*Eastport.*

Shed, Edward Edes, . . . 1866

*Ellsworth.*

Parcher, George A., . . . 1875

*Lewiston.*

Cook, John G., . . . 1859

Wakefield, Seth D., . . . 1875

<i>Portland.</i>				<i>Perkins, Elisha Henry,</i>	.	.	1857
<i>Cummings, Henry T.,</i>	.	.	1858	<i>Potts, Jesse Newport,</i>	.	.	1870
<i>Hay, Henry H.,</i>	.	.	1867	<i>Roberts, Joseph,</i>	.	.	1856
<i>Phillips, Walter F.,</i>	.	.	1859	<i>Rothrock, Weller,</i>	.	.	1869
<i>Richmond.</i>				<i>Russell, Eugene J.,</i>	.	.	1856
<i>Donnell, J. Woodbury,</i>	.	.	1875	<i>Russell, Edward Walton,</i>	.	.	1868
<i>Searsport.</i>				<i>Sappington, Richard,</i>	.	.	1870
<i>Curtis, Lebbens,</i>	.	.	1875	<i>Sharp, Alpheus Phineas,</i>	.	.	1855
<i>Waterville.</i>				<i>Sheets, James Addison,</i>	.	.	1870
<i>Plaisted, James H.,</i>	.	.	1875	<i>Smith, Edward A.,</i>	.	.	1870
<b>MARYLAND.</b>				<i>Suding, Henry A.,</i>	.	.	1870
<i>Baltimore.</i>				<i>Sylvester, Samuel Retallack,</i>	.	.	1858
<i>Andrews, George W.,</i>	.	.	1856	<i>Tilyard, Charles Slade,</i>	.	.	1867
<i>Baxley, Jackson Brown,</i>	.	.	1856	<i>Thompson, William Silver,</i>	.	.	1856
<i>Beam, Isaac Richard,</i>	.	.	1878	<i>Thompson, William Partlow,</i>	.	.	1874
<i>Brown, Alexander E.,</i>	.	.	1868	<i>Thomsen, John J.,</i>	.	.	1856
<i>Brown, William H.,</i>	.	.	1868	<i>Webb, John Alanson,</i>	.	.	1870
<i>Burrough, Edward Ewalt,</i>	.	.	1869	<i>Winkleman, John Henry,</i>	.	.	1864
<i>Burrough, Horace,</i>	.	.	1869	<i>Woodward, Samuel Morris,</i>	.	.	1874
<i>Dannattel, George F.,</i>	.	.	1867	<i>Annapolis.</i>			
<i>Dohme, Charles Emile,</i>	.	.	1868	<i>Button, Elijah,</i>	.	.	1870
<i>Dohme, Lewis,</i>	.	.	1859	<i>Cumberland.</i>			
<i>Donavin, Matthew W.,</i>	.	.	1867	<i>Shryer, Thomas H.,</i>	.	.	1875
<i>Eareckson, Edwin,</i>	.	.	1875	<i>Hagerstown.</i>			
<i>Elliott, Henry Alexander,</i>	.	.	1859	<i>Winter, Jonas,</i>	.	.	1868
<i>Emich, Columbus Valentine,</i>	.	.	1868	<b>MASSACHUSETTS.</b>			
<i>Frames, James P.,</i>	.	.	1868	<i>Boston.</i>			
<i>Gossman, Adam J.,</i>	.	.	1870	<i>Atwood Charles Henry,</i>	.	.	1856
<i>Hancock, John Francis,</i>	.	.	1868	<i>Babo, Leopold,</i>	.	.	1859
<i>Hassencamp, Ferdinand,</i>	.	.	1872	<i>Barry, Daniel E.,</i>	.	.	1875
<i>Jefferson, John H. B.,</i>	.	.	1868	<i>Bartlett, William Williams,</i>	.	.	1875
<i>Jennings, Nathaniel Hynson,</i>	.	.	1857	<i>Bassett, Charles Harrison,</i>	.	.	1867
<i>Kirby, Thomas E.,</i>	.	.	1868	<i>Bolles, William,</i>	.	.	1875
<i>Kleinschmidt, A. Alexander,</i>	.	.	1878	<i>Boyden, Ashel,</i>	.	.	1853
<i>Lauer, Michael John,</i>	.	.	1865	<i>Boyden, Edward Cleveland,</i>	.	.	1874
<i>Lautenbach, Robert,</i>	.	.	1870	<i>Brown, Joseph Taylor,</i>	.	.	1859
<i>Lilly, Alonzo, Jr.,</i>	.	.	1868	<i>Brown, Joseph Taylor, Jr.,</i>	.	.	1869
<i>Marion, Alfred N.,</i>	.	.	1872	<i>Burnett Joseph,</i>	.	.	1852
<i>Mitnach, Henry,</i>	.	.	1878	<i>Burnham, George H.,</i>	.	.	1871
<i>Monsarrat, Oscar,</i>	.	.	1856	<i>Campbell, Isaac Towle,</i>	.	.	1859
<i>Moore, Jacob Faris,</i>	.	.	1856	<i>Canning, Henry,</i>	.	.	1865
<i>Morrison, S. Ellwood,</i>	.	.	1868	<i>Carey, Edwin Franklin,</i>	.	.	1875
<i>Muth, John Phillip,</i>	.	.	1864	<i>Carter, Solomon,</i>	.	.	1865
<i>Osburn, William Henry,</i>	.	.	1870				

# ROLL OF MEMBERS.

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<i>Colcord, Samuel Marshall,</i>	. 1852	Sharples, Stephen Paschell,	. 1875
Colton, James B.,	. 1865	Sheppard, Samuel Airus D.,	. 1865
Craig, John Smith,	. 1875	Smalley, Elijah,	. 1860
Cutler, Edward Waldo,	. 1859	Smith, Albert E.,	. 1875
Davidson, Frank A.,	. 1873	Snow, Jesse Walker,	. 1875
<i>Doliber, Thomas,</i>	. 1859	Stowell, David,	. 1875
Doolittle, Erastus Hubbard,	. 1865	Talbot, James Stewart,	. 1873
Drury, Linus Dana,	. 1871	<i>Tompkins, Orlando,</i>	. 1859
Duncan, Jefferson E.,	. 1871	Tower, Levi, Jr.,	. 1860
Dyer, Joseph Howes,	. 1865	Trask, Charles M.,	. 1875
Eaton, Charles Irving,	. 1867	<i>Turner, Thomas Larkin,</i>	. 1858
Folger, William Swain,	. 1875	Underwood, Charles G.,	. 1865
Follansbee, Sherman,	. 1875	Warren, George W.,	. 1875
<i>Fowle, Henry D.,</i>	. 1853	Webster, Stephen,	. 1875
French, George Washington,	. 1865	Whall, Joseph Stokes,	. 1873
Fuller, Sumner Howard,	. 1875	Wiley, Abraham S.,	. 1857
Gleeson, James Andrew,	. 1859	Wilkins, Daniel Gilbert,	. 1865
Gleeson, Michael Henry,	. 1859	Wilson, Benjamin Osgood,	. 1859
Godding, John Granville,	. 1875	Winslow, Samuel W.,	. 1875
Henchman, Daniel,	. 1853	<i>Woodbridge, George Washington,</i>	. 1859
Hoagland, Pratt Ralph,	. 1868	Wright, William P.,	. 1875
Horton, William Francis,	. 1869		
Hoyt, George Melvin,	. 1875	<i>Andover.</i>	
Jenkins, Luther Lincoln,	. 1867	Parker, George H.,	. 1874
Jenks, Thomas L.,	. 1875		
Jones, James Taber,	. 1875	<i>Cambridge.</i>	
Jones, William Henry,	. 1875	<i>Hubbard, John H.,</i>	. 1866
Kelly, Edward Samuel,	. 1871	<i>James, Thomas P.,</i>	. 1857
Kent, Robert R.,	. 1855		
Leary, Jeremiah Thomas,	. 1869	<i>Cambridgeport.</i>	
Littlefield, Alvah,	. 1856	Bayley, Augustus R.,	. 1859
Lowd, John Colby,	. 1871	Orne, Joel Stone,	. 1859
Lowden, John,	. 1875	Orne, Charles Parker,	. 1874
Markoe, Geo. Frederick Holmes,	. 1863	Thayer, Henry,	. 1858
Melvin, James Samuel,	. 1853		
Merrick, John M.,	. 1875	<i>Charlestown.</i>	
<i>Metcalf, Theodore,</i>	. 1857	Kettell, George Parker,	. 1867
Nowell, William F.,	. 1867	Marshall, Ernest Clifton,	. 1875
O'Brien, James J.,	. 1875	Stacey, Benjamin Franklin,	. 1860
Parker, Joseph L.,	. 1864		
Patch, Edgar Leonard,	. 1872	<i>Chelsea.</i>	
<i>Patten, Ichabod Bartlett,</i>	. 1858	Buck, John,	. 1855
Perry, Edward Howland,	. 1865		
Restieaux, Thomas,	. 1853	<i>Chicopee.</i>	
Ricker, George Dexter,	. 1858	Smith, Warren,	. 1874
Rideout, James W.,	. 1875		
Sears, George T.,	. 1875	<i>Danvers.</i>	
Sewall, David H. Jewett,	. 1875	Merrill, Walter S.,	. 1875

<i>Dorchester.</i>			<i>Middleboro.</i>		
Prescott, Horace Augustus,	.	1875	Drake, Charles W.,	.	1878
<i>Fall River.</i>			<i>Milford.</i>		
Redfearn, John,	.	1878	Rice, J. Allen,	.	1875
<i>Fitchburg.</i>			<i>Monson.</i>		
Fortier, Zepherin,	.	1875	Phipps, John Metten,	.	1875
<i>Great Barrington.</i>			<i>Nantucket.</i>		
Lillie, Charles,	.	1875	Jaggar, Charles H.,	.	1875
Morgan, Richard E.,	.	1875	<i>Natick.</i>		
Whiting, Frederick T.,	.	1868	Daniels, Samuel Otney,	.	1875
<i>Greenfield.</i>			<i>New Bedford.</i>		
Childs, Louis Marshall,	.	1875	Blake, James E.,	.	1866
<i>Haverhill.</i>			Hadley, Frank R.,	.	1872
Frothingham, Edward G., Jr.,	1875		Lawton, Charles H.,	.	1878
<i>Hingham.</i>			Lawton, Horace A.,	.	1878
Hunt, James Lewis,	.	1865	Shurtleff, Israel H.,	.	1875
Lincoln, Henry Ware,	.	1858	Taylor, John P.,	.	1875
<i>Hinsdale.</i>			<i>Newburyport.</i>		
Plummer, George B.,	.	1875	Atkinson, Albert J.,	.	1875
<i>Holyoke.</i>			Goodwin, William W.,	.	1858
Wild, Joseph Oscar,	.	1878	Smith, Samuel A.,	.	1859
<i>Hudson.</i>			<i>Newton Centre.</i>		
Whitman, Nelson Samuel,	.	1875	Noble, John J.,	.	1875
<i>Lawrence.</i>			<i>North Adams.</i>		
Whitney, Henry M.,	.	1859	Griswold, William Henry,	.	1874
<i>Lee.</i>			McDonald, William,	.	1878
Noyes, Daniel N.,	.	1878	<i>North Andover.</i>		
<i>Lowell.</i>			Berrian, George W., Jr.,	.	1857
Bailey, Frederick,	.	1869	<i>Rockland.</i>		
Butler, Freeman Hall,	.	1874	Denham, Charles Sumner,	.	1875
Hood, Charles I.,	.	1871	Easton, Luther Waite,	.	1875
Kidder, Samuel, Jr.,	.	1859	Estes, Joseph Joselyn,	.	1870
Safford, William Augustus,	.	1865	<i>Rockport.</i>		
<i>Lynn.</i>			Blatchford, Eben,	.	1857
Gordon, Edward Bertelle,	.	1875	<i>Shelbourne Falls.</i>		
Proctor, Benjamin,	.	1859	Baker, Edwin,	.	1875
Tozzer, Samuel Clarence,	.	1875	<i>Somerville.</i>		
<i>Medford.</i>			Cowdin, George Henry,	.	1875
Clough, Thomas R.,	.	1875	Flanagan, Lewis Cass,	.	1875



# ROLL OF MEMBERS.

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<i>Springfield.</i>			<i>Kalamazoo.</i>		
Alder, Charles P.,	.	1874	MacDonald, George,	.	1871
Ferree, Henry D.,	.	1875	<i>Muskegon.</i>		
Masters, T. Edward,	.	1878	Wagener, Samuel H.,	.	1869
Preston, Alfred J.,	.	1878	<i>Pentwater.</i>		
Webber, John T.,	.	1878	Jesson, Jacob,	.	1872
Wilson, Howard E.,	.	1878	<i>Saginaw City.</i>		
<i>Taunton.</i>			Keeler, William H.,	.	1872
Marvel, Amos Francis,	.	1875	Moll, William,	.	1869
<i>Ware.</i>			<i>Schoolcraft.</i>		
Wilder, Frederick Wales,	.	1875	James, George R.,	.	1869
<i>Warren.</i>			<b>MINNESOTA.</b>		
Harwood, Frank Lucian,	.	1875	<i>St. Paul.</i>		
Harwood, Lucian,	.	1875	Sweeney, Robert Ormsby,	.	1866
<i>Worcester.</i>			<b>MISSISSIPPI.</b>		
Burbank, George G.,	.	1875	<i>Columbus.</i>		
Bush, William,	.	1875	Osborne, Hampden,	.	1869
McConville, Thomas Aloysius,	.	1864	<i>Jackson.</i>		
Scott, David,	.	1855	Ash, Matthew F.,	.	1856
Scott, Nelson R.,	.	1859	Buck, John T.,	.	1868
Willard, William Henry,	.	1875	<b>MISSOURI.</b>		
Williams, Joseph,	.	1875	<i>St. Louis.</i>		
<b>MICHIGAN.</b>			Alexander, Maurice W.,	.	1871
<i>Ann Arbor.</i>			Ayers, James M.,	.	1872
Eberbach, Ottmar,	.	1869	Bang, Charles,	.	1871
Prescott, Albert B.,	.	1871	Blake, Amos R.,	.	1871
<i>Battle Creek.</i>			Blank, Alois,	.	1871
Wardell, Robert C.,	.	1860	Blickhahn, George F.,	.	1871
<i>Detroit.</i>			Boehm, Solomon,	.	1871
Caldwell, James W.,	.	1875	Brown, Charles Scott,	.	1878
Johnston, William,	.	1860	Catlin, Ephron,	.	1871
Ronnefeld, Theodore,	.	1866	Catlin, Theron,	.	1871
Vernor, James,	.	1866	Chamberlain, Guilford T.,	.	1858
<i>East Saginaw.</i>			Chase, Charles D.,	.	1872
Dunk, Alfred A.,	.	1867	Connor, James F.,	.	1871
Garrigues, Samuel S.,	.	1855	Crawford, William Harper,	.	1864
Melchers, Henry,	.	1869	Crawley, Francis Xavier,	.	1869
<i>Jackson.</i>			Curtman, Charles O.,	.	1871
Austin, George W.,	.	1865	D'Amour, Otto,	.	1871
Weeks, Eugene J.,	.	1866	Glenn, Thomas Smith,	.	1870
			Good, James M.,	.	1871

Grandjean, Charles, . . . 1871	<i>Weston.</i>	
Grandjean, Eugene, . . . 1871	<i>Parr, John C., . . . 1856</i>	
Grant, William R., . . . 1871		
Guerdan, John, . . . 1871	<b>NEBRASKA.</b>	
Hensel, Samuel T., . . . 1872	<i>Omaha.</i>	
Hollister, Arthur P., . . . 1871	Goodman, Charles Frederick, . 1871	
Jones, Charles Kendall, . . 1867		
Kalb, Theodore, . . . 1864		
Kirkbride, Joseph Cooper, . 1869	<b>NEVADA.</b>	
Kovacs, Martin, . . . 1871	<i>Aurora.</i>	
Krebs, Hugo, . . . 1871	Green, Alexander Alfred, . 1868	
<i>Leitch, Arthur,</i> . . . 1860		
Mallinckrodt, Gustavus, . . 1869	<b>NEW HAMPSHIRE.</b>	
Mallinckrodt, Edward, . . . 1869	<i>Allentown.</i>	
Meyer, Christian F. G., . . . 1860	Hildreth, Charles Francis P., . 1874	
<i>O'Gallagher, James,</i> . . . 1858		
Physick, Henry Sanford, . . 1870	<i>Concord.</i>	
Primm, Hubert, . . . 1855	Eastman, Charles Smith, . 1874	
Richardson, J. Clifford, . . 1871	Foster, Henry B., . . . 1874	
Sander, Enno, . . . 1858	<i>Morgan, James,</i> . . . 1859	
Scheffer, Henry W., . . . 1868	Underhill, George Francis, . 1874	
Scholz, Philip, . . . 1871		
Sennewald, Ferdinand William, 1865	<i>Dover.</i>	
Steer, Justin, . . . 1869	Pinkham, Alonzo Taylor, . 1874	
Ude, George, . . . 1871	Rackley, Benjamin Franklin, . 1874	
Vardick, August H., . . . 1874	Tufts, Charles Augustus, . 1856	
Witte, L. Edward, . . . 1871	Vickery, William Henry, . 1874	
<i>Chillicothe.</i>	<i>Exeter.</i>	
Boyce, Samuel F., . . . 1871	Merrill, Charles A., . . . 1858	
<i>Hannibal.</i>	<i>Keene.</i>	
Orynski, Leonardo, . . . 1871	Appleton, George J., . . . 1873	
<i>Kansas City.</i>	<i>Lancaster.</i>	
Brackett, Aurick S., . . . 1868	Noyes, Parker Jewett, . . . 1874	
Breunert, Augustus, . . . 1868	<i>Manchester.</i>	
French, Paul F., . . . 1871	Jones, Charles Mortimer, . 1869	
Lyon, George P., . . . 1871	Littlefield, Chauncey Bonney, . 1868	
Mann, Albert H., . . . 1869	<i>Nashua.</i>	
<i>Macon.</i>	Russell, Elias Smith, . . . 1875	
Field, Amos, . . . 1871	<i>New Market.</i>	
<i>Mexico, Adrian Co.</i>	Dearborn, George L., . . . 1858	
Llewellyn, John Frederick, . 1867	<i>North Conway.</i>	
<i>Ravenna, Mercer Co.</i>	Wingate, Jeremiah Young, . 1875	
Featherston'h, Edward R., . 1871		

# ROLL OF MEMBERS.

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## Portsmouth.

Marvin, Thomas Ellison Oliver, 1875  
Thacher, Joseph Haven, . . . 1859

## Somersworth.

Moore, George, . . . 1859

## NEW JERSEY.

### Basking Ridge.

Muchmore, William Fletcher, 1868

### Burlington.

Vandegrift, John A., . . . 1867

### Camden.

Brown, Albert P., . . . 1870  
De la Cour, Joseph Lauriat, . . . 1870  
Lee, Emmor H., . . . 1875  
Test, Alfred W., . . . 1870

### Elizabeth.

Barnaby, Thomas J., . . . 1870  
Drake, Jonathan B., . . . 1875  
Oliver, William M., . . . 1875

### Elizabethport.

Frohwein, Richard, . . . 1867

### Hoboken.

Fehr, Julius, . . . 1870

### Jersey City.

Abernethy, Maxwell, . . . 1865  
Carman, George E., . . . 1872  
Cusack Robert, . . . 1875  
Dougherty, Samuel E., . . . 1875  
Finlay, Norman J., . . . 1875  
Gardner, Robert W., . . . 1872  
Kirsten, Adolph, . . . 1867  
Mellor, Godfrey K., . . . 1875  
Mercein, James R., . . . 1865  
Pauly, Christian, . . . 1875  
Phillips, George W. C., . . . 1871  
Sherman, Oliver G., . . . 1869  
White, George H., . . . 1868  
Wienges, Conrad, . . . 1875

### Moorestown.

Worthington, J. Willits, . . . 1873

## Morristown.

Carrell, Eugene A., . . . 1875  
Dalrymple, Charles H., . . . 1860  
McCarty, William, . . . 1878

## Mount Holly.

Miller, Louis, . . . 1874  
White, Aaron Smith, . . . 1860

## Newark.

BADGER, CHARLES W., . . . 1870  
Dreher, Ernest, . . . 1869  
Havenstein, Alexander, . . . 1870  
Hitchcock, William Edwin, . . . 1875  
Holzhauer, Charles, . . . 1878  
Jacques, Isaac W., . . . 1869  
Littell, William M., . . . 1870  
Mills, Andrew M., . . . 1872  
Nichols, Edward Payson, . . . 1870  
Peters, Alexander C., . . . 1868  
Smith, Charles Bradley, . . . 1868  
Townley, William M., . . . 1875  
Vandervoord, Ransford Wells, 1870  
Van Gieson, Theron W., . . . 1869  
Van Winkle, Abraham W., . . . 1871

## New Brunswick.

Rust, William, . . . 1870

## Orange.

Harlow, Wickham N., . . . 1874

## Plainfield.

Reynolds, Howard Prescott, . . . 1875  
Shaw, Robert Johnston, . . . 1875  
Vorhees, William H., . . . 1868

## South Amboy.

Jacques, George W., . . . 1869

## Trenton.

Mangold, George A., . . . 1875  
Rickey, Randal, . . . 1870

## NEW MEXICO.

### Santa Fe.

Krummeck, Jacob, . . . 1867

## NEW YORK.

### New York City.

Als Dorf, John, . . . 1872

Atwood, Hermon W., . . . .	1878	Johnson, Edward L., . . . .	1860
Balluff, Paul, . . . . .	1860	Kalish, Julius, . . . . .	1875
Balser, Gustavus, . . . . .	1875	<i>Kiersted, Henry T.</i> , . . . .	1856
Bedford, Peter Wendover, . .	1859	Kimmel, Henry, . . . . .	1867
Billings, Henry M., . . . . .	1869	Krehbiel, Gustavus, . . . .	1866
Bischof, Albert S., . . . . .	1875	Kuhles, Philip, . . . . .	1878
Buehler, Edward H., . . . . .	1874	Lazell, Lewis T., . . . . .	1858
Campbell, Horace W., . . . .	1875	Lehlbach, Paul Frederick, . .	1872
<i>Carle, John, Jr.</i> , . . . . .	1860	Lehn, Louis, . . . . .	1874
Cassebeer, Henry A., . . . . .	1858	Macmahan, Thomas Jackson, .	1871
Cassebeer, Henry A., Jr., . .	1872	Main, Thomas F., . . . . .	1872
Chandler, Charles F., . . . .	1867	Marsh, Edward H., . . . . .	1858
Close, Eldridge W., . . . . .	1874	McIntyre, Ewen, . . . . .	1878
Cole, Theodore, . . . . .	1878	McKesson, John, Jr., . . . .	1867
Creuse, Jules L. A., . . . . .	1871	Milhau, Edward L., . . . . .	1858
<i>Currie, John H.</i> , . . . . .	1858	Molwitz, Ernest, . . . . .	1867
Davis, Benjamin, . . . . .	1869	Neergaard, William, . . . .	1859
Day, Walter De Forest, . . .	1878	Osmun, Charles A., . . . . .	1868
Dege, George F., . . . . .	1868	Peixotto, Moses Levi Maduro,	1869
Ditman, Andrew J., . . . . .	1868	Pfingsten, Gustavus, . . . .	1878
Dung, Albert C., . . . . .	1872	<i>Porter, George G.</i> , . . . . .	1860
Eimer, Charles, . . . . .	1872	Ramsperger, Gustavus, . . . .	1860
<i>Faber, John</i> , . . . . .	1857	Raser, William H., . . . . .	1869
Fairchild, Benjamin Thomas, .	1875	Reichard, F. Alfred, . . . .	1871
Falke, William, . . . . .	1874	Reinold, Bernard H., . . . .	1861
Fisher, William, . . . . .	1862	Rice, Charles, . . . . .	1870
Fraser, Edward A., . . . . .	1878	Ricksecker, Theodore, . . . .	1875
Frey, John, . . . . .	1865	Robbins, Daniel C., . . . . .	1862
Fougera, Edmund C., . . . . .	1867	Royce, Lucien M., . . . . .	1866
Frohwein, Max, . . . . .	1865	Runyon, Edward Wheelock, . .	1875
Frohwein, Theobald, . . . . .	1862	Sands, George G., . . . . .	1867
Gardiner, Warren B., . . . . .	1860	Schmid, Henry, . . . . .	1874
Gilmore, John W., . . . . .	1867	Schofield, James L., . . . .	1867
Gellatly, William A., . . . . .	1858	Seward, Daniel W., . . . . .	1874
Goecke, Augustus Gottfried, . .	1867	Shedden, John W., . . . . .	1859
<i>Green, Thomas T.</i> , . . . . .	1858	Sheils, George E., . . . . .	1860
<i>Gridley, Junius</i> , . . . . .	1858	Skelley, James T., . . . . .	1866
Griffith, William H., . . . . .	1874	Starr, Thomas, . . . . .	1870
<i>Hale, Frederick</i> , . . . . .	1855	Stein, Gottlieb, . . . . .	1871
<i>Haviland, Henry</i> , . . . . .	1857	Tully, Andrew, . . . . .	1862
Hays, David, . . . . .	1867	Weaver, James, . . . . .	1860
Hebberling, Gottfried, . . . .	1867	Weinman, Oscar C., . . . . .	1878
Higgins, James S., . . . . .	1862	Weismann, Augustus W., . . .	1869
Hoffmann, Frederick, . . . . .	1867	Wellcome, Henry Solomon, . .	1875
Hohenthal, Charles F. L., . . .	1865	Wenck, George J., . . . . .	1869
<i>Hudnut, Alexander</i> , . . . . .	1857	Westerfield, Joseph H., . . .	1858
Imhof, Henry, . . . . .	1872	<i>Wheeler, Lucian F.</i> , . . . . .	1858
Jarrett, Henry T., . . . . .	1875	Whipple, Napoleon Dana, . . .	1871

# ROLL OF MEMBERS.

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White, Philip A., . . . . .	1872	<i>Buffalo.</i>	
Wickham, William Hull, . . . . .	1870	Fischer, Edward J., . . . . .	1875
Wright, William, Jr., . . . . .	1859	King, Alexander, . . . . .	1874
		<i>Peabody, William H., . . . . .</i>	1857
<i>Brooklyn.</i>		Rano, Charles O., . . . . .	1866
Althans, Charles A., . . . . .	1878	Tibbs, William H., . . . . .	1871
Barnaby, James Otis, . . . . .	1870		
<i>Bassett, Francis M., . . . . .</i>	1860	<i>Elmira.</i>	
Booth, Clarence, . . . . .	1875	Bidwell, Marshall Spring, . . . . .	1871
Chadwick, Alexander B., . . . . .	1872		
Close, George C., . . . . .	1858	<i>Flatbush.</i>	
Curtiss, Charles Grenville, . . . . .	1866	McElhenie, Thomas D., . . . . .	1872
Cutts, Foxwell Curtis, Jr., . . . . .	1875		
Day, Carlos E., . . . . .	1870	<i>Fishkill, on Hudson.</i>	
Daycock, William Henry, . . . . .	1874	Moith, Augustus Theodore, . . . . .	1866
Dennin, Charles, . . . . .	1875		
Douglass, Henry, Jr., . . . . .	1875	<i>Flushing.</i>	
Dunn, John A., . . . . .	1867	Hepburn, John, . . . . .	1878
<i>Dupuy, Eugene, . . . . .</i>	1852		
Harner, James M., . . . . .	1867	<i>Luzerne, Warren Co.</i>	
Heydenreich, Emile, . . . . .	1867	Miller, George Yenington, . . . . .	1872
Heydenreich, F. Victor, . . . . .	1860		
Jones, Thomas, . . . . .	1868	<i>Middletown.</i>	
Kitchen, Charles W., . . . . .	1865	King, James Theodore, . . . . .	1859
Lawlor, Charles J., . . . . .	1874	Rogers, William Henry, . . . . .	1869
Lewis, Thomas, . . . . .	1867		
Livingstone, Benjamin V. B., . . . . .	1872	<i>Mount Vernon.</i>	
Menninger, Henry J., . . . . .	1866	Gill, George, . . . . .	1872
Newman, George A., . . . . .	1865	Peck, Anley W., . . . . .	1874
Nicol, Lewis E., . . . . .	1875		
<i>Niebrugge, John H., . . . . .</i>	1861	<i>New Lebanon.</i>	
Nietsch, Adolph J. W., . . . . .	1872	Tilden, Henry A., . . . . .	1858
Ollif, James H., . . . . .	1867		
Owens, Richard J., . . . . .	1860	<i>Niagara Falls.</i>	
Peduzzi, George S., . . . . .	1861	Griffith, Hiram E., . . . . .	1875
Pyle, Cyrus, . . . . .	1859		
Snyder, Ambrose C., . . . . .	1867	<i>Plattsburgh.</i>	
Squibb, Edward R., . . . . .	1858	Cady, Hiram Walworth, . . . . .	1870
Tartiss, Alfred J., . . . . .	1867		
Vincent, William, . . . . .	1870	<i>Port Chester.</i>	
Wynn, William, . . . . .	1867	Hyler, William Henry, . . . . .	1875
		<i>Port Jervis.</i>	
		Cook, George L., . . . . .	1872
		McDougall, James, . . . . .	1874
<i>Albany.</i>			
Cutler, John N., . . . . .	1870	<i>Potsdam.</i>	
		Thatcher, Hervey D., . . . . .	1865
<i>Angola, Erie Co.</i>			
Oatman, Le Roy Sunderland, . . . . .	1872	<i>Poughkeepsie.</i>	
		Sherwood, Hezekiah Shorey, . . . . .	1870

<i>Rochester.</i>			<i>Raleigh.</i>		
Haas, George Hermann, .	.	1872	Lee, Addison Sherwin, .	.	1873
Lane, Alfred S., .	.	1857	Simpson, William, .	.	1873
<i>Rome.</i>			<i>Washington.</i>		
Bissell, John G., .	.	1875	Gallagher, Charles K., .	.	1857
<i>Rondout.</i>			Gallagher, James M., .	.	1875
Laycock, Washington, .	.	1857			
<i>Sag Harbor.</i>			OHIO.		
Lobstein, J. F. Daniel, .	.	1868	<i>Cincinnati.</i>		
<i>Sandbank.</i>			Archibald, Henry C., .	.	1867
Belden, James L., .	.	1874	Bain, Adrien W., .	.	1874
Kelley, Edward F., .	.	1870	Eger, George, .	.	1864
<i>Saratoga Springs.</i>			Feemster, Joseph H., .	.	1873
Fish, Charles F., .	.	1866	Fennel, Adolphus, .	.	1864
Fish, George H., .	.	1869	Foertmyer, Adolphus W., .	.	1864
Lamberton, John F., .	.	1872	Fratz, John G., .	.	1864
Mingay, James, .	.	1873	Gordon, William John Maclester, .	.	1854
<i>Syracuse.</i>			Greve, Theodore L. A., .	.	1864
Chamberlain, Humphrey Barker, .	.	1874	Heinemann, Otto, .	.	1864
<i>Tompkinsville, L. I.</i>			Helman, Charles M., .	.	1864
Bassett, John W., .	.	1875	Hill, Alfred C., .	.	1864
<i>Troy.</i>			Hill, Hiram H., .	.	1864
Knowlson, Alexander M., .	.	1875	Hottendorf, Augustus, .	.	1864
Sliter, Albert H., .	.	1875	Judge, John F., .	.	1866
<i>Utica.</i>			Karrmann, William, .	.	1864
Ballard, George S., .	.	1874	Koehnken, Herman Henry, .	.	1875
Howarth, John W., .	.	1874	Keeshan, John, .	.	1864
<i>West Farms.</i>			Lloyd, John Uri, .	.	1870
Webb, Henry E., .	.	1865	Markward, James, .	.	1864
<i>Yonkers.</i>			Merrell, William S., .	.	1854
Stephens, William G., .	.	1860	Reinlein, Paul, .	.	1856
Toplis, Robert J., .	.	1868	Reum, Hermann F., .	.	1864
NORTH CAROLINA.			Wayne, Edward S., .	.	1854
<i>Chapel Hill.</i>			Wells, Jacob David, .	.	1864
Saunders, Richard B., .	.	1858	Yorston, Matthew Mackay, .	.	1864
<i>Fayetteville.</i>			<i>Alliance.</i>		
Hindsdale, Samuel J., .	.	1875	Barr, Peter H., .	.	1867
			<i>Ashland.</i>		
			Foltz, William K., .	.	1872
			<i>Bryan.</i>		
			Snyder, Alva L., .	.	1873

<i>Canton.</i>			<i>South Charlestown.</i>		
Geiger, Conrad John, . . .	1866		Allen, Alexander B., . . .	1869	
Geiger, Walter P., . . .	1867				
			<i>Springfield.</i>		
<i>Chillicothe.</i>			Casper, Thomas J., . . .	1867	
Howson, Walter H., . . .	1875		Ludlow, Charles, . . .	1872	
			Smith, Charles G., . . .	1874	
<i>Circleville.</i>			Stout, William A., . . .	1875	
Fickardt, George H., . . .	1864				
			<i>Toledo.</i>		
<i>Cleveland.</i>			Hobly, Charles, . . .	1872	
Bock, August W., . . .	1872				
Gaylord, Henry C., . . .	1869		<i>Wooster.</i>		
Hartness, William H., . . .	1872		Ohliger, Lewis P., . . .	1871	
Huling, Bruce, . . .	1872				
Mayell, Alfred, . . .	1872		<i>Youngstown.</i>		
Moore, James Penn, . . .	1872		Neal, Leander, . . .	1858	
Scott, William J., . . .	1872				
Spencer, Peter J., . . .	1872		<b>OREGON.</b>		
Vaupel, Charles P., . . .	1872		<i>Portland.</i>		
			Hodge, Charles, . . .	1859	
<i>Columbus.</i>					
Boyd, Abraham, . . .	1869		<b>PENNSYLVANIA.</b>		
Huston, Charles, . . .	1872		<i>Philadelphia.</i>		
Ritson, Alfred, . . .	1870		Abell, Walter B., . . .	1867	
Roberts, John S., . . .	1872		Angney, John R., . . .	1867	
			Bakes, William C., . . .	1864	
<i>Elyria.</i>			Bauer, Louis G., . . .	1867	
Hill, Frank P., . . .	1872		Biddle, Charles Johnson, . . .	1875	
			Blair, Andrew, . . .	1865	
<i>Fredericktown.</i>			Blair, Henry C., . . .	1868	
Jefferson, William E., . . .	1875		Blinkhorn, George, . . .	1860	
			Borell, Henry Augustus, . . .	1874	
<i>Ironton.</i>			Boring, Edwin McCurdy, . . .	1867	
Ball, Theophilus B., . . .	1874		Bossler, David Jarvis, . . .	1878	
			Bower, Henry, . . .	1860	
<i>Logan.</i>			Bower, Henry A., . . .	1868	
Harrington, Frank, . . .	1869		Bullock, Charles, . . .	1857	
			Bunting, Samuel S., . . .	1857	
<i>Middletown.</i>			Burk, William B., . . .	1878	
Hatfield, Vermont, . . .	1874		Caldwell, James Marshall, . . .	1866	
			Campbell, Samuel, . . .	1864	
<i>Navarre.</i>			Carpenter, George W., . . .	1878	
Garver, Alexander, . . .	1866		<i>Chapman, Samuel,</i> . . .	1857	
Grossklaus, John F., . . .	1859		Chipman, Edward D., . . .	1872	
			Coombe, Thomas R., . . .	1860	
<i>Salem, Columbiana Co.</i>			Cramer, Henry, . . .	1867	
Hawkins, M. Smith, . . .	1870		Dobbins, Edward T., . . .	1867	
<i>Shreve.</i>					
Bertolett, William J., . . .	1872				

Eberle, Charles Louis, . . .	1865	Pile, Wilson H., . . .	1857
Eddy, Henry C., . . .	1869	Power, Frederick B., . . .	1872
Eldridge, George W., . . .	1865	Preston, David, . . .	1868
<i>Ellis, Evan T., . . .</i>	1857	Procter, Wallace, . . .	1874
England, Robert, . . .	1868	Remington, Joseph P., . . .	1867
Erben, John S., . . .	1868	Riley, Charles W., . . .	1868
Evans, William, Jr., . . .	1860	<i>Rittenhouse, Henry N., . . .</i>	1857
Fox, Peter P., . . .	1869	Robbins, Alonzo, . . .	1865
Gerhard, Samuel, . . .	1873	Roche, Edward Manning, . . .	1868
Grahame, Israel J., . . .	1856	Roche, William Ford, . . .	1868
Grove, John E., . . .	1868	Rosengarten, Mitchell G., . . .	1869
Haenchen, Charles Eugene, . . .	1865	Scattergood, George J., . . .	1860
Hance, Edward H., . . .	1857	Selfridge, Matthew M., . . .	1858
Hancock, Charles West, . . .	1868	Shivers, Charles, . . .	1860
Hancock, John Henry, . . .	1870	Shinn, James Thornton, . . .	1860
<i>Hassard, Peter J., . . .</i>	1853	Shoemaker, George Y., . . .	1862
Hazard, Thomas H., . . .	1870	Shoemaker, Joseph L., . . .	1867
<i>Heintzelman, Joseph A., . . .</i>	1858	Shoemaker, Richard M., . . .	1869
Hurst, John C., . . .	1868	Shryock, Allen, . . .	1868
Jackson, James M., . . .	1874	Simpers, J. Wilmer, . . .	1874
Jefferson, Charles L., . . .	1869	Snowdon, George M., . . .	1857
<i>Jenks, William J., . . .</i>	1858	Souder, Joseph A., . . .	1870
Johnson, Benjamin F., . . .	1859	Spannagel, Charles C., . . .	1874
Jones, Alexander H., . . .	1874	Taylor, Alfred B., . . .	1852
Jones, Daniel S., . . .	1859	<i>Thompson, William B., . . .</i>	1858
Jones, Edward Charles, . . .	1864	Tilge, Frederick A., . . .	1868
Jones, Samuel T., . . .	1867	<i>Troth, Samuel F., . . .</i>	1857
Kay, Isaac H., . . .	1870	Vogelbach, Hermann A., . . .	1868
Keasbey, H. G., . . .	1878	<i>Warner, William R., . . .</i>	1857
Keeney, Caleb R., . . .	1868	Weaver, J. Thornton, . . .	1868
Keys, Roger, . . .	1868	Webb, William H., . . .	1867
Koch, Louis, . . .	1872	Weber, William, . . .	1872
Kreweon, William Egbert, . . .	1875	Weidemann, Charles A., . . .	1868
Lippincott, Henry B., . . .	1868	Wendel, Henry Edward, . . .	1873
Maisch, John M., . . .	1856	Wiegand, Thomas S., . . .	1857
Mason, Frederick E., . . .	1871	Wilder, Hans M., . . .	1866
Mattison, Richard V., . . .	1873	<i>Wilson, Adam H., . . .</i>	1859
McIntyre, William, . . .	1868	Wright, Archibald W., . . .	1868
McKelway, George Irvin, . . .	1874		
Mellor, Alfred, . . .	1864	<i>Allegheny City.</i>	
Miller, Adolphus W., . . .	1868	Brill, William H., . . .	1872
Milligan, Decatur, . . .	1867	Eggers, Frederick H., . . .	1872
Mitchell, Charles L., . . .	1874	Lutz, Harrison S., . . .	1872
Moore, Joachim Bonaparte, . . .	1860		
Needles, Caleb H., . . .	1868	<i>Beaver, Beaver Co.</i>	
Parrish, Clemmons, . . .	1868	Andriessen, Hugo, . . .	1875
<i>Parrish, Dillwyn, . . .</i>	1857		
<i>Perot, T. Morris, . . .</i>	1857	<i>Bethlehem.</i>	
		Luckenback, Edward H., . . .	1870



Meyers, Edward T, . . . 1867	<i>Quakertown.</i>	
Rau, Eugene A., . . . 1870	Penrose, Stephen F., . . . 1871	
<i>Chambersburg.</i>	<i>Reading. ♦</i>	
Oressler, Charles H., . . . 1868	Raser, John B., . . . 1872	
Heyser, William, Jr., . . . 1866	Stein, Jacob H., . . . 1869	
<i>Columbia.</i>	Ziegler, Philip Milton, . . . 1867	
Meyers, James A., . . . 1867	<i>Tamaqua.</i>	
<i>Easton.</i>	Albrecht, Emil, . . . 1875	
Weaver, John A., . . . 1878	<i>Towanda.</i>	
<i>Erie.</i>	Porter, Henry C., . . . 1869	
Nick, William Frederick, Jr., 1869	<i>Wilkesbarre.</i>	
<i>Harrisburg.</i>	Holmes, Clay W., . . . 1878	
Finney, Thomas J., . . . 1874	<i>Williamsport.</i>	
George, Charles T., . . . 1873	Cornell, Edward A., . . . 1878	
Miller, Jacob A., . . . 1873	Duble, Jesse Balderston, . . . 1870	
<i>Lancaster.</i>	<i>York.</i>	
Heinitsh, Charles A., . . . 1857	Smith, William, . . . 1878	
Hubley, Alfred A., . . . 1870		
<i>Lebanon.</i>	<b>RHODE ISLAND.</b>	
Lemberger, Joseph L., . . . 1858	<i>East Greenwich.</i>	
<i>Mansfield, Allegheny Co.</i>	Congdon, Albert J., . . . 1860	
Christy, Robert, . . . 1871	<i>Newport.</i>	
<i>Meadville.</i>	Blackman, Lyman Rawson, . . . 1865	
Sorensen, Sophus, . . . 1872	Cotton, William Henry, . . . 1875	
<i>New Castle.</i>	Frost, William A., . . . 1875	
Cubbison, James M., . . . 1878	Taylor, James Henry, . . . 1875	
<i>Oil City.</i>	<i>Providence.</i>	
Griffith, Albert R., . . . 1870	Blanding, William B., . . . 1875	
<i>Pittsburg.</i>	Culder, Albert L., . . . 1859	
Abel, Joseph, . . . 1864	Mason, Norman Nelson, . . . 1875	
Caldwell, Joseph F., . . . 1872	Phillips, Francis James, . . . 1875	
Cherry, James B., . . . 1868	<i>Westerly.</i>	
Hostetter, Charles M., . . . 1870	Lattimer, Robert F., . . . 1857	
Mattern, John C., . . . 1860	<i>Wyoming.</i>	
Ottinger, Franklin, . . . 1871	Greene, George E., . . . 1875	
Rankin, Alfred J., . . . 1864		
<i>Pottstown.</i>	<b>SOUTH CAROLINA.</b>	
Cunningham, John M., . . . 1867	<i>Aiken.</i>	
<i>Pottsville.</i>	Harbers William Henry, . . . 1875	
Kennedy, George Washington, 1869		

<i>Charleston.</i>			<i>Ludlow.</i>		
Almar, George Washington,	.	1874	Sherman, Linus Etias,	.	1875
Burnham, Edward S.,	.	1874	<i>Rutland.</i>		
Eckel, Augustus W.,	.	1874	Higgins, Albert W.,	.	1870
Frampton, Lingard A.,	.	1874	Lewis, Elam C.,	.	1870
Gibson, William A.,	.	1874	<i>St. Johnsbury.</i>		
Luhn, Gustavus Johann,	.	1878	Bingham, Charles Calvin,	.	1875
Michaelis, Charles Otto,	.	1874	Randall, George Dallas,	.	1875
Pauknin, Charles F.,	.	1874	<i>Vergennes.</i>		
<b>TENNESSEE.</b>			Young, John Edward,	.	1875
<i>Bolivar.</i>			<i>Windsor.</i>		
Larwill, Joseph H., Jr.,	.	1858	Paine, Milton Randall,	.	1875
<i>Knoxville.</i>			<b>VIRGINIA.</b>		
Albers, George W.,	.	1872	<i>Alexandria.</i>		
<i>Memphis.</i>			Lunt, Samuel H.,	.	1878
Hampson, Hugh H.,	.	1869	Stabler, Richard H.,	.	1856
Hoerner, Theodore,	.	1871	<i>Fredericksburg.</i>		
Robinson, James S.,	.	1869	Hall, Marshall C.,	.	1870
Safford, William B.,	.	1875	<i>Harrisonburg.</i>		
Steever, Henry C.,	.	1865	Avis, James L.,	.	1878
<i>Nashville.</i>			<i>Lynchburg.</i>		
Ewing, William G.,	.	1872	Lumsden, Charles H.,	.	1875
Laurent, Eugene L.,	.	1872	Strother, William A.,	.	1874
Lillard, Benjamin,	.	1869	<i>Norfolk.</i>		
Thomas, James, Jr.,	.	1875	Burrow, John W.,	.	1878
Wharton, J. C.,	.	1872	Masi, Frederick Henry,	.	1873
<b>TEXAS.</b>			Smith, John W.,	.	1873
<i>Dallas.</i>			Taylor, William A. S.,	.	1873
Connor, L. Myers,	.	1874	<i>Petersburg.</i>		
<i>Fort Worth.</i>			Goodwyn, John W.,	.	1873
Powell, Thomas W.,	.	1874	<i>Richmond.</i>		
<b>UTAH.</b>			Anthony, Joseph,	.	1873
<i>Salt Lake City.</i>			Baker, Thomas Roberts,	.	1878
Perkins, William Alexander,	.	1869	Blunt, Ira Washington,	.	1873
<b>VERMONT.</b>			Bodeker, Henry,	.	1873
<i>Brandon.</i>			Conrad, William Alexander S.,	.	1873
Crossman, George A.,	.	1872	Dove, John Edwin,	.	1873
Warren, Charles Henry,	.	1872	Dupuy, Powhatan Eldridge,	.	1873
			Farrar, Samuel Wesley,	.	1873
			Fischer, Hermann Emil,	.	1873

Meade, Richard Hardaway, . . . 1878	WISCONSIN.
Nesbitt, Charles Albert, . . . 1878	<i>Beloit.</i>
Nolting, Adolphus William, Jr., 1870	Collins, Charles Frederick Gove, 1859
Purcell, John B., . . . 1875	<i>Fond du Lac.</i>
Scott, Albert Augustus, . . . 1878	Curren, Edward S., . . . 1869
Scott, William Henry, . . . 1878	<i>Janesville..</i>
Wagner, Louis, . . . 1878	Heimstreet, Edward Burton, . 1874
Willis, Joseph Norment, . . . 1878	<i>Mazomanie.</i>
	Senier, Alfred, . . . 1869
WEST VIRGINIA.	Senier, Alfred, Jr., . . . 1874
<i>Charlestown.</i>	Senier, Frederick S., . . . 1874
Boggs, Edwin L., . . . 1872	<i>Milwaukee.</i>
	Drake, John R., . . . 1860
<i>Wheeling.</i>	<i>Watertown.</i>
Bocking, Edmund, . . . 1874	Eberle, Herman T., . . . 1875

# DOMINION OF CANADA.

QUEBEC.	<i>Lindsay.</i>
<i>Montreal.</i>	Gregory, Edmund, . . . 1875
Gray, Henry R., . . . 1867	<i>London.</i>
Lyman, Benjamin, . . . 1875	Saunders, William, . . . 1860
Lyman, Stephen Jones, . . . 1875	<i>Stratford.</i>
ONTARIO.	<i>Waugh, George J., . . . 1862</i>
<i>Caledonia.</i>	<i>Toronto.</i>
Walker, John A., . . . 1873	Rose, Henry J., . . . 1872
<i>Guelph.</i>	
Petrie, Alexander Bain, . . . 1867	

# WEST INDIES.

BERMUDA.	CUBA.
<i>Hamilton.</i>	<i>Cardenas.</i>
Heyl, James B., . . . 1863	Cahill, John F., . . . 1870

# U. S. OF COLOMBIA.

<i>Panama.</i>
Herbruger, Florence C., . . . 1867

# NICARAGUA.

<i>Granada.</i>
Guzman, Horace, . . . 1871

# LIST OF DECEASED MEMBERS.

## HONORARY MEMBERS.

		Elected.	Died.
Bache, Franklin, M.D.,	Philadelphia, Pa.,	1857,	1864
Bailey, Montgomery J., M.D ,	New York, N. Y ,	1856,	1878
Boullay, Pierre François Guillaume,	Paris, France,	1868,	1869
Casselmann, Arthur, Ph.D.,	St. Petersburg, Russia,	1868,	1872
Deane, Henry,	London, England,	1868,	1874
Durand, Elias,	Philadelphia, Pa.,	1857,	1873
Farrington, Thomas,	Boston, Mass.,	1856,	1867
Hanbury, Daniel,	London, England,	1868,	1875
Ludwig, Hermann, Ph.D.,	Jena, Germany,	1871,	1873
Robinet, Stephane,	Paris, France,	1868,	1869

## ACTIVE MEMBERS.

		Elected.	Died.
Anderson, James H.,	New York, N. Y.,	1859,	1866
Aspinwall, James S ,	New York, N. Y.,	1855,	1874
Bache, Charles L ,	San Francisco, Cal.,	1852,	1854
Backus, James W.,	Marine City, Mich.,	1867,	1870
Balmer, James,	Baltimore, Md.,	1856,	1866
Barry John W.,	Baltimore, Md.,	1856,	1861
Baylis, William E. P.,	Brooklyn, N. Y.,	1860,	1872
Baynon, John,	Shreveport, La.,	1858,	1862
Benzinger, John Sylvester,	Baltimore, Md.,	1860,	1869
Bigelow, Francis O.,	Medford, Mass.,	1859,	1863
Billings, Samuel J.,	New York, N. Y.,	1860,	1865
Bingham, John C.,	St. Johnsbury, Vt.,	1858,	1870
Blair, Henry C.,	Philadelphia, Pa.,	1855,	1862
Blauw, Hippolyt A.,	Rochester, N. Y.,	1856,	1870
Bowman, Henry K.,	Philadelphia, Pa.,	1869,	1873
Bright, James Evesson,	Worcester, Mass.,	1868,	1872
Bringhurst, Ferris,	Wilmington, Del.,	1862,	1871
Brown, John T.,	Boston, Mass.,	1859,	1860
Brown, William,	Boston, Mass.,	1858,	1875
Canavan, Benjamin,	New York, N. Y.,	1855,	1857
Carney, Charles Tibbetts,	Boston, Mass.,	1853,	1862

# LIST OF DECEASED MEMBERS.

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		Elected.	Died.
Caspari, Charles,	Baltimore, Md.,	1856,	1870
Chapman, William B. (Pres. 1854-55),	Cincinnati, Ohio,	1852,	1874
Churchill, George W.,	Chelsea, Mass.,	1865,	1869
Clency, William F.,	Cincinnati, O.,	1859,	1865
Coddington, Isaac,	New York, N. Y.,	1855,	1874
Colby, Moses D.,	Boston, Mass.,	1859,	1870
Coon, Walter S.,	New York, N. Y.,	1858,	1861
Coppuck Peter V.,	Mount Holly, N. J.,	1857,	1869
Cressman, Noah,	Waterloo, Canada West,	1863,	1864
Cunningham, James E.,	Pittsburg, Pa.,	1860,	1868
Cushman, Alexander,	New York, N. Y.,	1858,	1861
Davies, Robert J.,	Brooklyn, N. Y.,	1858,	1872
De Motte, Henry A.,	Jersey City, N. J.,	1871,	1873
D'Evers, Henry Gaston,	Chicago, Ill.,	1865,	1870
Dodge, John P.,	New York, N. Y.,	1855,	1868
Easterbrook, Ray B.,	New York, N. Y.,	1858,	1868
Ellis, Charles (Pres. 1857-58),	Philadelphia, Pa.,	1852,	1878
Emanuel, Louis M., M.D.,	Linwood, Pa.,	1857,	1868
Everson, John C.,	Philadelphia, Pa.,	1863,	1872
Fish, George B.,	Saratoga Springs, N. Y.,	1860,	1866
Fish, Henry F.,	New York, N. Y.,	1852,	1868
Forester, Richard,	Brooklyn, N. Y.,	1860,	1862
Fulton, John Culpepper P.,	Brooklyn, N. Y.,	1873,	1874
Gabaudan, Arthur W.,	New York, N. Y.,	1862,	1870
Gay, William,	Cambridgeport, Mass.,	1858,	1862
Gerhard, John C.,	Cincinnati, O.,	1862,	1866
Geyer, Andrew,	Boston, Mass.,	1853,	1855
Graefle, Frederick Alexander,	Baltimore, Md.,	1870,	1878
Groneweg, Louis,	Cincinnati, O.,	1864,	1866
Harbaugh, Valentine,	Washington, D. C.,	1856,	1871
Hegeman, Frederick Augustus,	New York, N. Y.,	1855,	1860
Hegeman, William,	New York, N. Y.,	1858,	1875
Hensch, Hugo,	Cleveland, O.,	1872,	1878
Hendel, Samuel D.,	St. Louis, Mo.,	1858,	1871
Hill, Henry E.,	Detroit, Mich.,	1866,	1868
Hollis, Thomas,	Boston, Mass.,	1853,	1875
Hommann, James W.,	New York, N. Y.,	1875,	1875
Jardella, Jerome B.,	Vincennes, Ind.,	1865,	1870
Jenkins, William Ellis,	Boston, Mass.,	1865,	1869
John Frederick L., *	Philadelphia, Pa.,	1856,	1864
Johnston, Charles P.,	Memphis, Tenn.,	1868,	1878
Junghanns, Charles A.,	Cincinnati, O.,	1858,	1862
Keffer, Frederick A., M.D.,	New Orleans, La.,	1862,	1878
Kennedy, Robert C.,	Cleveland, O.,	1865,	1868
Kent, Asbury,	Cincinnati, O.,	1854,	1860
Kent, William,	Cincinnati, O.,	1864,	1867
Kidder, Darius B.,	Boston, Mass.,	1858,	1874

		Elected.	Died.
King, Henry,	New York, N. Y.,	1858,	1867
Knapp, Edwin E.,	Norwalk, Conn.,	1860,	1862
Laidley, Joseph,	Richmond, Va.,	1852,	1861
Lancaster, Thomas A.,	Philadelphia, Pa.,	1859,	1876
Lane, James B.,	Fitchburg, Mass.,	1856,	1867
Leitch, Alexander,	St. Louis, Mo.,	1858,	1868
Lineaweaver, Kline Cyrus,	Washington, D. C.,	1864,	1878
Little, William B.,	Panama, U. S. Colombia,	1857,	1867
Longshaw, William, Jr., M.D.,	Bayou Sara, La.,	1858,	1864
Lyon, Charles H., Jr.,	Boston, Mass.,	1858,	1871
McBride, James,	St. Louis, Mo.,	1864,	1871
McConville, Michael S.,	Worcester, Mass.,	1859,	1873
McDonald, John,	Brooklyn, N. Y.,	1860,	1861
McIntyre, Timothy C., M.D.,	Washington, D. C.,	1858,	1862
McPherson, George B.,	Cincinnati, O.,	1867,	1871
Massot, Eugene L.,	St. Louis, Mo.,	1857,	1871
Matt, Joseph,	Columbus, O.,	1872,	1874
Maxwell, James T.,	New York, N. Y.,	1855,	1860
Mayer, Ferdinand F.,	New York, N. Y.,	1859,	1869
Meakim, John (Pres. 1855-56),	New York, N. Y.,	1852,	1863
Metcalf, Tristram W.,	Brooklyn, N. Y.,	1857,	1878
Melzar Augustus P.,	Wakefield, Mass.,	1856,	1874
Milhau, John (Pres. 1867-68),	New York, N. Y.,	1855,	1874
Muller, William H.,	Chicago, Ill.,	1865,	1870
Nagle, John G.,	Baltimore, Md.,	1863,	1869
Nairn, Jos. Wilson,	Washington, D. C.,	1858,	1875
Nadand, James W.,	Cincinnati, O.,	1864,	1868
Norgrave, Samuel K.,	Pittsburg, Pa.,	1857,	1871
Olliffe, William J., M.D.,	New York, N. Y.,	1858,	1866
O'Brien, Joseph C.,	Baltimore, Md.,	1863,	1873
Osgood, Samuel W.,	Davenport, Iowa,	1858,	1860
Palmer, Albert G.,	Washington, D. C.,	1858,	1860
Parker, Herschel,	Brooklyn, N. Y.,	1867,	1870
Parrish, Edward (Pres. 1868-69),	Philadelphia, Pa.,	1852,	1872
Peck, Samuel P.,	Bennington, Vt.,	1853,	1859
Pettis, Newton C.,	North Adams, Mass.,	1868,	1874
Philbrick, Samuel R., M.D.,	Boston, Mass.,	1852,	1859
Phillips, Llewellyn,	Baltimore, Md.,	1856,	1866
Platzer, Robert,	Philadelphia, Pa.,	1865,	1874
Polhemus, James L.,	Sacramento, Cal.,	1866,	1867
Pollard, Charles P.,	Marysville, Cal.,	1859,	1869
Procter, William, Jr. (Pres. 1862-63),	Philadelphia, Pa.,	1852,	1874
Pyle, J. Lindley,	Brooklyn, N. Y.,	1859,	1866
Rehfuss, Lewis,	Cincinnati, O.,	1854,	1856
Reifsnider, William E.,	Baltimore, Md.,	1864,	1872
Roberts, David,	Boston, Mass.,	1858,	1863
Rollman, Frederick,	Philadelphia, Pa.,	1862,	1864

# LIST OF DECEASED MEMBERS.

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		Elected.	Died.
Roemer, Daniel,	Cincinnati, O.,	1865,	1870
Sands, Jesse M.,	New York, N. Y.,	1860,	1867
Scott, John,	Cincinnati, O.,	1854,	1873
Scully, Harmar D.,	Pittsburg, Pa.,	1858,	1866
Smith, Charles Augustus,	Cincinnati, O.,	1852,	1862
Smith, Edwin R.,	Monmouth, Ill.,	1862,	1869
Squire, William H.,	Germantown, Pa.,	1862,	1865
Steiner, Henry,	Philadelphia, Pa.,	1857,	1858
Stevens, Ashbel Mead,	Cincinnati, O.,	1854,	1860
Stevens, Rufus Walker,	Somersworth, N. H.,	1859,	1868
Sweetser, Thomas Augustus,	South Danvers, Mass.,	1859,	1860
Taylor, Robert J.,	Newport, R. I.,	1859,	1871
Taylor, William,	Philadelphia, Pa.,	1868,	1871
Thomas, William,	Jersey City, N. J.,	1855,	1856
Uhl, Charles,	Memphis, Tenn.,	1860,	1878
Waite, Samuel B.,	Washington, D. C.,	1858,	1862
Warren, William,	Brighton, Mass.,	1857,	1871
Watson, William J.,	Brooklyn, N. Y.,	1853,	1872
Weyman, George W., Ph.D.,	Pittsburg, Pa.,	1858,	1864
White, Daniel F.,	Charlestown, Mass.,	1859,	1864
White, William P.,	Chicago, Ill.,	1865,	1866
Whitehead, Silas,	Lynchburg, Va.,	1856,	1858
Wilson, George C.,	Boston, Mass.,	1859,	1861
Wiseman, Charles,	Baltimore, Md.,	1856,	1862
Witzell, Louis,	Cincinnati, O.,	1864,	1867
Wood, G. Davidge,	Baltimore, Md.,	1856,	1868
Woods, Samuel H.,	Boston, Mass.,	1859,	1869
Wright, George,	New York, N. Y.,	1869,	1878

# LIST OF RESIGNATIONS.

Names.	Residence.	Elected.
Bird, George W.,‡	Brookline, Mass.,	1867
Brewer, William A.,‡	New York,	1858
Emertin, James,†	Salem, Mass.,	1859
Ferris, Charles E.,†	New Castle, Del.,	1867
Jenkins, Thomas E.,†	Louisville, Ky.,	1866
Lee, John B.,†	Newark, N. J.,	1870
Nick, Hermann C.,†	Erie, Pa.,	1869
Wood, Robert B.,†	Richmond, Va.,	1878

† Obligated from ill health to give up business.

† Left the business.

‡ No reason given.

## LIST OF MEMBERS DROPPED FROM THE ROLL.

Names.	Residence.	Elected.
Aarons, William C.,	Cincinnati, O.,	1854
Adderly, William H.,	" "	1854
Aldridge, George,	Bay City, Mich.,	1872
Arnold, George K.,	Cambridgeport, Mass.,	1871
Brown, Thomas,	Chicago, Ill.,	1865
Baldwin, Charles E.,	Aurora, Nev.,	1871
Baker, Edward F.,	Kansas City, Mo.,	1871
Baker, Nathan T.,	Belleville, Ill.,	1871
Callender, George E.,	Cincinnati, O.,	1878
Caspari, William,	Baltimore, Md.,	1856
Colburn, Walter P.,	Peoria, Ill.,	1869
Crawford, John S.,	Cincinnati, O.,	1868
Daniels, Thomas,	Toledo, O.,	1866
Dort, Oliver Tilman,	Keene, N. H.,	1858
Douglass, Samuel H.,	Ann Arbor, Mich.,	1869
Duffield, Samuel P.,	Detroit, Mich.,	1859
Egle, William H.,	Harrisburg, Pa.,	1870
Griffith, John H.,	Detroit, Mich.,	1866
Hanning, John T.,	Chicago, Ill.,	1864
Hazeltine, Charles B. R.,	Worcester, Mass.,	1867
Hirsch, Joseph,	Chicago, Ill.,	1869
Laird, William R.,	Jersey City, N. J.,	1867
Maddock, William L.,	St. Joseph, Mo.,	1871
Maynard, Frederick T.,	Petaluma, Cal.,	1864
Meseroll, James C.,	Jackson, Mich.,	1867
Mercer, Nathan,	Montreal, C. W.,	1867
Merkel, Louis J.,	Chicago, Ill.,	1871
Miller, Edward T.,	Indianapolis, Ind.,	1871
Moffitt, John W.,	San Francisco, Cal.,	1870
Morris, Patrick Henry,	Englewood, N. J.,	1871
Randals, Evermont,	St. Louis, Mo.,	1867
Savory, George A.,	Minneapolis, Minn.,	1869
Sayre, Charles L.,	Washington, D. C.,	1869
Schroeder, Nobel,	Chicago, Ill.,	1866
Searles, William C.,	Groversville, N. J.,	1872
Simms, John H.,	Wilmington, Del.,	1867
Simoneau, Leander,	East Saginaw, Mich.,	1869
Shultz, Frederick William,	Kansas City, Mo.,	1871
Street, Job F.,	Bay City, Mich.,	1869
Smith, John Jacob,	Baltimore, Md.,	1856
Vorhees, William S.,	Morristown, N. J.,	1868
Von Nieda, John W.,	North Danville, Pa.,	1868



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